Scientific American.

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

VOL. XIV. NEW YORK, FEBRUARY 26, 1859. NO. 25.

THE
SCIENTIFIC AMERICAN,
PUBLISHED WEEKLY
At No. 37 Park-row (Park Building), New York,
BY MUNN & CO.

O. D. MUNN, S. H. WALES, A. E. BEACH.

Responsible Agents may also be found in all the principal cities and towns of the United States.

Single copies of the paper are on sale at the office of publication, and at all the periodical stores in this city Brooklyn and Jersey City.

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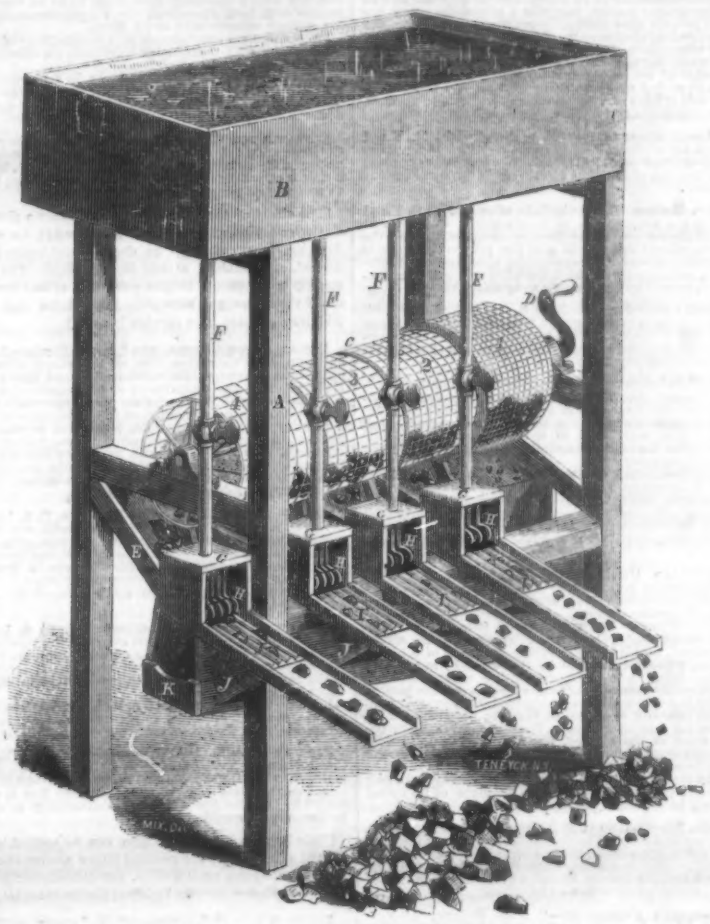
The 116lb. weight of water which forms three-fourths of the matter composing our bodies is rejected with great rapidity in respiration and natural discharge. The carbon is expired with each action of the lungs in large quantities, combined with oxygen, another constituent of our bodies, in the form of carbonic acid. The lime escaping in other ways, is rejected from our bones and replaced by a fresh supply. There is not a movement of the body, whether voluntary or involuntary; not an action of a member, a muscle, or a nerve; not a pulsation of the heart or artery; not a peristaltic motion of the intestines, which is not the proximate cause of the rejection of the used-up matter and the demand for a fresh supply from the digestive apparatus, just as in a machine the wear and tear of the parts is proportional to the force and continuance of their motions. Although the rapidity with the materials of the body are thus changed varies, in comparing one individual with another, according to their varying habitudes and occupations, it appears that a total change of the material constituents of the body takes place within an interval much shorter than was supposed by the early physiologists. According to some authorities, the average length of the interval does not exceed thirty days. It is, however, generally agreed that it is a very brief period. This, then, being the case, let us ask, what is it that was identical in the Duke of Wellington dying at Walmer, in September, 1852, with the Duke of Wellington commanding at Waterloo in June, 1815? Assuredly it was not possible that there should have been a single particle of matter common to his body on the occasions. The interval consisting of a period of thirty-seven years and two months, the entire mass of matter composing his body must have undergone a complete change several hundred times; yet no one doubts that there was something there which did not undergo a change, except in its relation to the mutable body, and which possessed the same thought, memory, and consciousness, and constituted the personal identity of the individual; and hence it is as demonstrable as any proposition in geometry that something which thus abode in the body, retaining the consciousness of the past, could not have been an atom, or any number of atoms, of matter, that is to say, something spiritual.—*Dr. Lardner.*

ARTIFICIAL WOOD SPIRIT.—M. Berthelot, of Paris, has succeeded in transforming marsh gas—a compound of carbon and hydrogen—into ether and alcohol, and he thinks that all the hydro-carbons may be made to produce vinous spirit by the same process.

EVANS' COAL-WASHER.



There are many popular fictions which still hold their place in the common mind, and it is one of our especial objects to explode their falsity, and replace them by good wholesome truths. For example, it is generally supposed that coal is a very dirty substance, and many a child has been compared to it, as a symbol of dirt, by its anxious mother, with the remark, "You are as black as coal!" Now, this we say is a slander on the mineral, which is entitled, in conjunction with iron ores, to the highest esteem with which the human race can regard a thing inanimate. Coal, in its native state, although black, is clean, and it only becomes dirty by mixing in the darkness of the mine with the impure shales that are found intermingled with the black diamond. From this cause it requires washing to free it from the dirt before being sent to the market to render it the bright and shining thing it appears when in the parlor coal scuttle.

To always have it clean, and thus increase its market value, J. P. Evans, of Hazelton, Luzerne county, Pa., has invented the excellent machine which is the subject of our illustration. By its use the shale may be easily distinguished from the coal, so that the two are quickly separated, which cannot be done when the coal is covered with dirt, and it will thus save machinery at the coal-breakers, require less labor to pick the slate, and less water for washing the coal. The machine itself is remarkably simple, and will be readily understood from a description of its operation.

The whole is sustained by a frame, A, on the top of which is a water-tank, B. The coal is supplied down a hopper or other suitable device into perforated cylinder, C. This cylinder or sieve is placed in the frame at an angle, and the smallest pieces drop through the finest part of the sieve, 1, on to an inclined shute, E, and pass at once away into a separate heap. The next sized lumps pass through 2, and falling down E into the box, G, they meet a stream of water coming from B down a tube, F, on the inner end of which a rose may be placed. The coal is then carried by the water over the grooved bed, I, and the water and dirt pass through a slot at the bottom of I down a shute, J, into the trough, K, by which it can be conveyed away, while the washed coal falls off the inclined platform into its proper heap or receptacle. The coal falling through the sieves, 3 and 4, undergoes the same operation, and the large coal that falls through the end of the cylindrical sieve is also washed by a similar contrivance. The corrugations on I being angular, and the slate or shale being in flat small slabs, it passes with the dirty water down the shute, J. There are a series of weighted tappets, H, that swing in the box, G, and they can be so graduated as to regulate the rate with which the coal is washed, and so keep it a longer or shorter time in contact with the stream of water as is requisite to clean it. It will be understood that the coal is supplied in a broken state to the sieve, which is to be kept rotated either by a handle, D, or any other convenient device.

This truly excellent machine—one of great importance to the coal trade—was patented Sept. 21, 1858, and any further information can be had by addressing the inventor, as above.

Chemical, Natural, and Physical Magic.

A little book, full of marvels, has just been issued from the press of Messrs. Longman & Co., of London, but, so far as we know, is not yet to be had in our market. Its author is Septimus Piesse, whose name is so well known to the readers of the SCIENTIFIC AMERICAN. This volume will delight and instruct juveniles, and cannot fail to make them adepts in skillful conjuring. Mr. Piesse's magic greatly excels in skill the tricks of the most popular professors; and he has a "reason why" for all of them. We heartily commend the little volume as a most acceptable companion for those who need to enliven evenings in their country-houses.

As an example of the amusing and instructive character of its contents, we present the following:—

The Mysterious Lamp.—At a distance from the earth which is utterly impossible to convey any idea of, there is another globe; and if the optical and astronomical calculations be correct, the sun which lights and warms that globe (for it has a particular sun of its own) gives days of different colors. There are green days, red days, blue days, yellow days corresponding with Sir Isaac Newton's seven prismatic colors. Now, all objects visible on these days will, of course, vary according to the particular color. The yellow day, from our experience of this color, must be the most dreary and most miserable; for though yellow is all very well in its way, mixed up with other colors, helping like the thunder cloud to enhance the beauties of the distant sky, yet, when everything is yellow, then we discover its peculiar effect on our visual organs. A simple and inexpensive experiment, and one that is often shown in the Colisseum and Polytechnic Institution, illustrates the effect of a yellow day. Spirits of wine poured on a teaspoonful of common salt in a vial, well shaken, and then put either on to lamp-cotton or tow, and ignited, will burn with a peculiar colored flame, giving out purely yellow rays. This mysterious effect changes the appearance of all earthly objects. Coral lips become of a livid hue; rosy cheeks turn ghastly pale; red cap ribbons become black; in fact, everything appears different to what it does by the white light we are familiar with; and of all things, the human face undergoes the greatest change. Very young children should not be shown this experiment; for though there will be laughing lips and dazzling eyes, yet they are of such an unearthly color, that old friends would appear with new faces, and a child would scarcely know its own mamma.

Evaporation.

From the whole surface of the ocean, says Dr. Dick, there arises, every twelve hours, no less than thirty million cubic feet of water, which is more than sufficient to supply all the rivers on the earth. This immense body of water is formed into clouds, and carried over every part of the continents; and again it is condensed into rain, snow, or dews, which fertilize the earth. Should this process pause, we might wash our clothes, but centuries would not dry them, for evaporation alone produces this effect; vegetation would wither; rivers would swell the ocean; the operations of nature would cease. So close is the connection between this process and vegetable and animal life. "Praise the Lord, for He causeth the vapors to ascend from the ends of the earth."

Patent Claims

Issued from the United States Patent Office

FOR THE WEEK ENDING FEBRUARY 15, 1859.

Reported officially for the Scientific American.

. Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

BEE HIVES—George C. Aiken, of Nashua, N. H.: I do not claim the invention of a hive having a main chamber placed between a feeding chamber and one or more honey boxes.

But I claim the arrangement of the boxes, G G' H H', in the hive, so as to form, with the case thereof, the auxiliary or bell glass chambers, K K K K, in manner as described.

TREATMENT OF HIDES AND SKINS—Joseph Armstrong, of Woburn, Mass.: I claim the described improvement on my patented process of treating hides, or, in other words, I claim in combination with the application and use of a press, in connection with the impregnation of the hide with grease, by a peg-lined cylinder, or any equivalent means, the employment of scraps of hide, or other suitable absorbents, in the press, and against the edges and other necessary parts of the hides, and so as, during the operation of the press, to absorb the liquor from such edge or parts on or in which it would be likely to remain, as specified.

ARRANGEMENT OF THE FEED ROLLER IN WOOD-PLANING MACHINES—H. H. Baker, of New Market, N. J.: I do not claim the cutter wheel or disk, F, in itself considered.

Nor do I claim the adjustable gage, J, for they have been previously used.

But I claim arranging the feed roller, N, substantially as shown, to wit, connecting it with a vibrating shaft, K, box, *L*, slide, O, spring, P, and with necessary gearing, so that said roller may be kept to the work or moved out free from it without stopping the working or running parts of the machine.

[This is an improvement in that class of wood-planing machines in which cutters are attached to or project from the face of a rotating vertical wheel or disk. The object of this invention is to materially reduce the friction attending the working of this class of planing machines, as well as prevent the disfiguring of the work. Also to facilitate the cutting operation, and the placing of the feeding device under the complete control of the attendant, so that the device may be thrown in and out of gear with the work without stopping the working parts of the machine.]

HYDRANTS—Frederick H. Bartholomew, of New York City: First, I claim the combination of the valve, E, with the main valve, and its fixed valve seat, C, the whole constructed, arranged and operating substantially as and for the purposes described.

Second, I claim the arrangement of chamber, D D, within the trunk of the hydrant surrounding the seat of the main valve, having a waste passage at the bottom, substantially as and for the purposes described.

Third, I claim the arrangement of the waste passage, the waste ping, and rod, in combination, substantially as and for the purposes described.

MOLE PLOW—Moses Bales, of Big Plain, Ohio: I claim the adjustable mole plows, D d d' d'' g g' e, upon a cutting shaft, A, arranged and operating substantially as and for the purposes set forth.

REEFING AND FURLING SAILS—Charles E. Bishop, of Brooklyn, N. Y.: I claim, first, The employment of supplementary sheets to the topsails, and other upper square sails of a vessel, in order that said sails may be kept more "flat," and that the strain upon the ends of the yard may be lessened, as set forth.

Second, I claim constructing topsails in the manner described, that is to say, with supplementary sheets, clew-lines, and leech ropes, and with a central tackle, by the employment of which in due order, as set forth, the topsail may be reduced and secured in successive portions, substantially as described.

CARPET-STRETCHER—Isaac W. Bragg, of Cincinnati, Ohio: I claim first, The dog, E e, operating substantially as described, to attach the stretcher to that part of the floor next the wall, toward which the carpet is to be stretched.

Second, The combination and arrangement of the trip lever, F, for disengaging the dog, as set forth.

Third, The combination and arrangement of the apron, C, feet, B, and slides, G, operating substantially as described, in combination with the rake, H, to prevent the teeth, h, from grazing the floor.

Fourth, The combination and arrangement, substantially as set forth, of the stock, A, dog, E e, driver, H I K, and actuating worm, M, operating in the manner and for the purpose explained.

METHOD OF OPERATING YIELDING FEED ROLLERS—Joseph H. Brinton, of Westchester, Pa.: I claim a pair of feed rolls, one of which is yielding, and both driven by the same screw shaft, and in gear with it at all times, substantially in the manner described.

SKATES—Thomas W. Brown, of Boston, Mass.: I claim the rocker and angular heel or straight edge runner, made substantially in manner as described, and applied to the bearing plates or their equivalent, so as to be capable of being reversed with respect to the same, and used with either edge downward, as may be desirable.

I also claim the application of the heel plate to the heel screw, so as to be adjustable on, or with reference thereto, substantially in manner and for the purpose as described.

STOVES—James D. Bruner, of Alton, Ill.: I claim, first, Connecting and arranging with an oven which has no bottom, and between which and the passages of the products of combustion there is no communication, and the fire-box of the stove, air chambers or cells, as and for the purposes set forth.

Second, Combining with a detachable grate surface the detachable air cells or chambers, as described.

INSTRUMENTS FOR THREADING NEEDLES—S. S. Burlingame, of Warwick, R. I.: I claim the needle-threader consisting of an internally-barbed elastic pronged fork, substantially as described.

[This improved needle-threader is more particularly intended for threading worsted needles, which, owing to the narrowness of their eyes, and the large size and loose character of the thread used in them, are very troublesome to thread with the fingers.]

CULTIVATOR TEETH—William P. and Theodore H. Ford, of Concord, N. H.: We claim the described cultivator teeth, formed substantially as specified.

CUT-OFF VALVES FOR STEAM ENGINES—Adam Scott Cameron, of New York City: I claim the employment of the trip hinged valves, with their hook rods and appendages for operating them, or the equivalents thereof, substantially as described, in combination with the slide valve, substantially as described, for cutting off the steam in steam engines, as described.

I also claim, in combination with the slide and the trip hinged valve, operated substantially as described, the so-forming the seat of the slide valve relatively to the steam passages in the slide valve, substantially as described, as to admit the steam to the under face of the hinged valve and balance the pressure before they are opened, as set forth.

I also claim, in combination with the slide and trip hinge valves, combined and operating substantially as described, the employment of the adjustable cone, or its equivalent, substantially as described, to regulate the period of cutting off the steam, as described.

And I also claim the cone, or its equivalent, in combination with the eccentric tube, or its equivalent, substantially as described, as a means of adjusting the relative periods of closing the two valves, as set forth.

HARVESTERS—Daniel Clow, of Janesville, Wis.: I claim constructing the main supporting wheel thereof in such a manner as to form therein an outer and an inner zig-zag groove, but this I only claim when the said grooves have differently-proportioned reaches, and bear such a relation to the T-headed sliding bar, n, and the other parts of the machine which are connected with said bar and with the cutting apparatus, that the number of the movements imparted to the cutter bar can be varied at pleasure by shifting the bearings of the said sliding bar, n, from one position to another, substantially as set forth.

HAMES—Henry Cogswell, of Greenwich, N. Y.: I claim the application of the shifting slide to hames as they are now used, by means of which slide the point and position of the draft of the hames can be altered as desired.

PEN HOLDER—Benjamin Cole, of Brooklyn, N. Y.: I claim the construction of a pen-holder with three or more elastic shanks or fingers, so arranged that the spring of said fingers will hold the pen by pressing it against and under the shoulders, c, of two lateral fingers, and thus admit the introduction of, and be adapted to, pens of any ordinary size or thickness.

FIRE-PROOF FLOORS—John B. Connell, of New York City: I claim constructing a fire-proof foundation upon a series of wooden girders, for the reception of a flooring surface formed of boards or other suitable materials, substantially as set forth.

BREECH-LOADING FIREARM—Frederick Curtis, of Saugus Center, Mass.: When a breech slide is used in connection with the barrel of a firearm, I claim a movable breech, separate from the breech slide, and arranged and applied therein, so as to be adjustable to the rear end of the barrel, substantially in manner and for the purpose as described.

I also claim the arrangement of the priming nipple and the touch-hole thereof, with respect to the movable adjustable breech applied to the breech slide, as specified, or with respect to the same, and a primer arranged in the stock, substantially as explained, such arrangement being productive of advantages as before-mentioned.

RAILROAD CAR SPRINGS—Augustus B. Davis, of Philadelphia, Pa.: I lay no claim to any specific part or any particular device, when viewed as disconnected from the entire spring.

But I claim as a new and useful article of manufacture and merchandize the entire railroad car spring described, that is to say, a spring composed of a box or casing with a lid attached to the same by means of a bolt or bolts, the said box containing a number of spiral springs confined longitudinally between the bottom of the box and the lid, and retained in their proper position laterally by means of lugs, or other suitable devices, the said lid having a limited movement in the direction of the springs, but having no lateral movement independent of the box, so that each spiral spring may be independent of the other, although the whole act in combination, the entire spring thereby retaining its elasticity, even should one or more of its spiral springs be broken or damaged.

SHOE LASTS—John C. F. Deecken, of New York City: I do not limit myself to the particular shape of the endless chain, the wheels, or the knives.

But I claim the endless chain or band in combination with a knife or knives, operated in the manner and for the purpose substantially as described.

UMBRELLA FASTENINGS—Charles DeSaxe, of New York City: I am aware that catch bolts operated by means of springs, and having knobs or projections to depress them, have been used to support and fasten hinged or jointed rods, such rods being also connected by tubular hinged joints, and therefore I do not claim, generally, the use of bolts to fasten such rods, or the use of a tubular hinged joint to connect them.

But I claim the arrangement of the bolt, a, substantially as described, operating without springs, and by a double or sliding and rotating motion in combination with the tubes or sockets, B B, for the purposes set forth.

MODE OF SQUEEZING AND STRAIGHTENING TOBACCO—Martin D. Elsom, of Howardsville, Va.: I claim squeezing and straightening bundles of tobacco, with a view of their being afterwards "struck" by passing them through a straightening and compressing mechanism, substantially such as represented.

CHURN—John U. Fiester, of Winchester, Ohio: I claim the adjustable dasher, constructed with two blades, D, yoke spring, E, cross tie, F, with slots, a, and pins, b, together with holes, f, and air cavities, d, operating substantially as set forth and described.

WRENCH—Daniel P. Foster, of Shelburne Falls, Mass.: I claim making the hinge joint between the stationary and movable jaw of the wrench a a, viz., by the projections, c, on the stationary jaw, and the depression, e, in the washer that is on the shank of the movable jaw, for the purpose of allowing the movable jaw to change its position in relation to the stationary one, as set forth, and for the purpose explained.

SHACKLE OF TELEGRAPH CABLES, &c.—George Gilmour, of Chelsea, Mass.: I do not claim a chain shackle such as I have heretofore patented, as made with a spring-forked pawl or catch, to operate with a friction roller.

But I claim the telegraph cable or rope shackle, as constructed with one or more jaws, and mechanism to operate the same, substantially as described.

I also claim combining either the wing, l, or the knife, m, or both, with the shackle, so as to operate therewith in manner and for the purpose or purposes as specified.

CORK-CUTTING MACHINE—George Hammer, of Philadelphia, Pa.: I do not desire to confine myself to the described construction and combination of the parts in minutiæ.

But I claim the described arrangement of guiding rollers, O and P, and sliding wedge, S, or their equivalents, in combination with the stop, s, the whole being constructed and operating substantially in the manner and for the purpose set forth.

HORSE-POWER EQUALIZER—Gorges Hely, of Laporte, Ind.: I claim first, Connecting the eveners, G I, by a rope or chain that passes over a pulley at the center of the shaft, A, substantially as described.

I also claim, in combination with the eveners, the method of connecting the points or parts to which the horses are hitched, and by which they draw, by means of a system of ropes or chains and pulleys connected with the draft bars, substantially as described.

ROTARY ENGINE—Samuel Huse, of Chicago, Ill.: I claim the cams, E E2, with their steam and exhaust ports, in combination with the heads, m m2, pistons, n n2, and cylinder, C, operating in the manner substantially as set forth.

METHOD OF LIGHTING GAS BY GALVANIC ELECTRICITY—W. W. Hopkins, of Amelia, Ohio: I do not claim broadly the letting-on of gas to burners by electricity, or the lighting of gas by heat generated in a platinum wire by a current of electricity passing through it.

But I claim the arrangement and combination of the hollow permanent magnet, A, valve chamber, C, coil, F, electro-magnetic valve, E, and tube, D, as and for the purpose shown and described.

[A gas-burner is combined with an electro-magnetic seat in this invention, to control the letting-on and shutting-off the gas; and there is also a certain arrangement of the conducting wires of an electric circuit in which the electro-magnetic valve is placed, by which a piece of platinum constituting a part of the same circuit, and occupying a position over the burner, is caused to be heated by the same action by which the valve is opened, and so ignite the gas.]

HARVESTERS—Moses G. Hubbard, of Penn Yan, N. Y.: I claim connecting the cutting apparatus with the machine by an adjustable attachment, which can be changed from a free hinge to a joint, rigid in one direction or in both directions, for the purposes and in the manner substantially as set forth.

I also claim the employment of a raising lever of the second order with a gradually increasing purchase, by which it is made self-sustaining.

And I also claim keeping the lever in a convenient position for operation by the hand of a driver, by means of a spring, substantially as and for the purpose specified.

ELEVATOR FOR WINDOW SASHES—William Huey, of Christiana, Pa.: I claim the arrangement and combination of the rods, F E, pawls, f, ratchets, d'', loose drums, e e', sliding shaft, D, pins, d e, and cords, b b, as and for the purpose shown and described.

[The object of this invention is to obtain a simple elevating device, which may be so applied to the window that either sash may be elevated and lowered as desired, and retained at any desired hight. The invention is designed to facilitate the raising and lowering of the sashes, and supersede the weights and appliances that have been previously used.]

APPARATUS FOR COMPRESSING ELASTIC FLUIDS—John Jameson, of 10 Catharine Terrace, Gateshead, County of Durham, England. Patented in England March 13, 1858: I claim the compression and expansion of aeriform fluids by an apparatus of the nature described, the same consisting of a combination and arrangement of a series of cylinders or vessels, perforated or tubular pistons, induction and connecting pipes, valves, a reservoir, a rotary shaft, and means of heating, or heating and cooling the cylinders or vessels, the whole being constructed and made to operate in manner and for the purpose substantially as described.

TAPE PRIMER FOR FIREARMS—Theodore T. S. Laidley, of U. S. Army: I claim the combination of two different materials in the manufacture of tape primers, one a metal or like substance, to receive and protect the percussion powder, into which it can be firmly pressed, and the other to connect the former into a series, something that can be easily severed by the edge of the hammer.

ADJUSTABLE SIGHT FOR FIREARMS—Richard S. Lawrence, of Hartford, Conn.: I am aware of the construction of a sight by connecting an elevator with the barrel, or with a fixed and inflexible base, firmly secured to the barrel by a hinge, socket, or other joint, all of which I disclaim.

I claim the application of said hinge joint to the spring base and elevator, constructed and arranged substantially as described.

BURGLAR ALARM—G. A. Lilliendahl, of New York City: I claim the arrangement of the slide, C, and plate, A, with the lips, c and b, so that a cartridge placed on the slide and between the two lips is exploded by pushing the slide in, substantially as and for the purpose specified.

[This improved burglar alarm can be applied to a door or window, and the moment either are interfered with so as to press upon a slide, the slide discharges a cartridge filled with some highly explosive material.]

RAILROAD CAR LANTERNS—S. N. Lennon, of Deposit, N. Y.: I claim suspending within the lantern, A, at two opposite sides, and over or behind the colorless glass plates, a a, the frames, C C, provided with the colored glass plates, c d, and arranged as shown, or in an equivalent way, to operate as and for the purpose set forth.

[A signal switch lamp was patented by this inventor July 27, 1858. The present one is an improvement on it, and is designed to simplify, to a considerable extent, the patented article, so as to reduce the cost of construction without in the least detracting from its efficiency, but on the contrary rendering it less liable to get out of repair.]

SEWING MACHINES—Clark Marsh, of New Milford, Conn.: I claim the ring gage, D E, with the pins, c c c, spring, d, and cam, e, or their equivalents, constructed and applied in combination with the slide ring, B C, substantially as and for the purpose set forth.

[The sewing machine patented by A. B. Wilson June 15, 1852, is the basis of this improvement, which is also applicable to all machines in which a similar combination of a rotating hook for extending the loops of the needle thread, and a bobbin for carrying the locking thread are employed. It consists in a gage applied to, or in combination with, the slide ring, by which the bobbin is confined in proper relation to the rotating hook, for the purpose of adjusting the ring to permit exactly the required amount of play to the bobbin between the face of the hook and the bobbin, thereby obviating the difficulty which, owing to the difference in the thicknesses of bobbins, has heretofore been experienced in the adjustment of the ring in case of a bobbin being changed.]

PRESERVE CANS—James F. Martin and Henry C. Nicholson, of Mount Washington, Ohio: We do not claim, broadly, the construction of a hermetically-sealed fruit or provision can.

Nor do we claim coating vessels with vitrious enamel, both being well known and in common use.

But we claim as a new and useful article of manufacture, a fruit or provision can, to be hermetically sealed, constructed of metal, lined on the inside with a vitrious enamel, capable of withstanding the action of the acids contained in the fruits, &c., to be preserved, substantially in the manner set forth.

We also claim the combination of a metallic cover, vitriously enameled on the inside, with a fruit or provision can, substantially as set forth.

STOVES—David N. Martin, of Lawrence, Mass.: I claim the arrangement of the air register, G, at the upper part of the ascending discharge flue, E, and with respect to the direct damper, F, substantially as described and represented, the ascending discharge flue being arranged between the two descending flues of the stove case, substantially as set forth.

WINDMILLS—John M. May, of Janesville, Wis.: I claim, first, A standard, D, arranged in the head, a, of the frame-work, and so constructed that it serves as a guide for the central vertical shaft, B, receptacle for gear, E, or gear, E', or gear, F2, support and axis for the horizontal axle or shaft of the wind wheel, and as a guide for the sliding thimble, O, substantially as and and for the purposes set forth.

Second, Furnishing each of the stems of the sails with a cogged segment, for the purpose of revolving the sails on their radial axes, the segments being operated by cogged rack bars attached to the sliding thimble, K, substantially as and for the purpose set forth.

Third, The arrangement consisting of the main governor and the forked adjusting rod, N, connected with each other, for the purpose of operating the thimble, O, in regulating or controlling the wind wheel, as set forth.

Fourth, Providing each of the stems of the sails with a weighted arm, projecting forward of the front surface of the sails, for the purpose of governing the velocity of the wind wheel by regulating the obliquity of the sails to the wind current, substantially as set forth.

Fifth, The covering made in two sections which are constructed and arranged as shown, the tubular section T, revolving with the wind wheel independently of section S, when the wind wheel moves in the path of a vertical circle, and with it when the wind wheel moves in the path of a horizontal circle, as and for the purposes set forth.

WINDMILLS—John M. May, of Janesville, Wis.: I claim, first, The peculiarly-constructed stationary central vertical shaft, A, in combination with the peculiarly constructed revolving tubular shaft or hollow column, B, the shaft, A, providing axes for the wind wheel, and the tubular column, B, to revolve upon in the paths of horizontal circles, and serving as a support and guide of the structure of the wind wheel, and the tubular column, B, serving for receiving the power of the wind wheel and transmitting it to machinery, substantially as set forth.

Second, Enlarging the axle, C, at its shoulder, in the form of a hub or pipe box, c, that the axis, d, of the shaft, A, may pass up directly through it, so that the center of the axis of the shaft, A, and axle, C, intersect, and in themselves form vertical and horizontal center bearings within the angle formed by the gear wheels, D and E, and the shaft, A, and axle, C, also serve as bearings for the gear wheels, substantially as and for the purposes set forth.

Third, The combination of a horizontal lever, S, the vertical governing rod or bar, Q, guide bar, R, and thimble, G, on the tubular column, substantially as and for the purposes set forth.

Fourth, The employment of a revolving conical cover, for the purposes of protecting the mechanism of the wind wheel, and dividing the wind current at the front and center of the wind wheel head and guiding it upon the sails, and relieving the weighted elbow lever used for revolving the sails on their radial axes of the countervailing influence of the wind current, so as to enable them to act by centrifugal force with certainty in governing the velocity of the wind wheel, substantially as set forth.

CRACKER MACHINE—John McCollum, of New York City: First, I claim in combination with the carrying apron, B, the roller, A, with its doffer, F, or the equivalent thereof, and the supporting or feed roller, D, and supporting table, C, or their substantial equivalents in the combination the rollers and apron moving with simultaneous intermittent progressive motion, the whole being so arranged, and operated, substantially as set forth, described, and shown, so as to progressively flat pellets of dough suitable for crackers, ship biscuit, and similar articles, placed in proper order upon the apron, and at suitable distances from each other to permit of the extension of diameter resulting from the operation, as they pass under the roller, A, without materially disturbing the order of their arrangement on the apron.

Second, I claim the reciprocating docker in combination with the carrying apron, bed, and stationary perforated clearer plate, substantially as described, and substantially for the purposes set forth, and with or without adjustable springs in combination therewith, to make yielding pressure at the docking point, substantially as described.

Third, I claim the flatting apparatus, as set forth and described in the specification and in the first claim, when combined with or used in combination with a docking apparatus, such as is set forth and described in the specification and in the second claim, or the substantial equivalent thereof, when used, combined and operated for the purpose of docking flatted pellets of dough for crackers as they are progressively brought to and under the docker from the flatting apparatus, without materially disturbing the order of their arrangement on the apron, substantially as set forth and described.

DOVETAILING MACHINE—W. A. McDonald, of Mott Haven, N. Y.: I claim the cutter-head, D, formed of a screw thread, g, on a cylinder, f, the screw thread being provided with cutters, h, and arranged substantially as described and for the purpose set forth.

[This invention consists in a cutter-head constructed in a novel way, and used in connection with an adjustable bed, so as to form one portion of dovetail joints by a continuous operation in a rapid and perfect manner.]

PRINTING PROCESS—Gordon McKay, of Boston, Mass.: I claim the combination of an impression cylinder and nippers, operating in conjunction with a blast pipe or mechanical means for producing an inequality of atmospheric pressure on the sheet when released by the nippers, and as said sheet is forced onwards by or with the impression cylinder in its rotary movement, substantially in the manner and for the purpose set forth.

REPEATING FIREARM—Henry H. McKinney and Frederic Goth, of Biddeford, Maine: We do not claim a firearm constructed not only with its nipples or primers arranged one in advance of the other on the barrel, but with a lock having a hammer or striker to operate with each nipple or primer.

But we claim the combination of two strikers, one trigger, and a mechanism which will not only enable each striker to be set to and maintained at full cock, but by retraction of the trigger, will cause both strikers when at full cock, to be discharged or set free consecutively, so as to be forced against their respective nipples, or the percussion caps, or priming thereon, or the equivalents of such, and cause explosion of the priming of the charges in the order as specified.

We also claim the specified application of the lock case with respect to the barrel in combination with the construction and arrangement of the trigger-rod or slider in separate parts, and in such manner as to be capable of being locked together, and of being unlocked or disconnected under circumstances as specified.

We also claim the application and arrangement of the two main springs of each striker in the lock case, as explained.

We also claim the combination of the trigger slide, F, and the lever scars, arranged and operating with respect to the two strikers, as specified.

CRUETS OR BOTTLES FOR CASTORS—J. O. Mead, of Philadelphia, Pa.: I do not desire to confine myself to the use of four bottles, or cruets, only, inasmuch as more or less than that number may be adapted to each other, and comprised within a small compass in the same manner as the four.

But I claim constructing the cruets or bottles of cruet-stands, so that they may be adapted to each other and to the stand, substantially as set forth and for the purpose specified.

PREVENTING FRICTION ON AXLES—T. S. Minniss and T. S. Minniss, of Meadville, Pa.: We claim the employment of sectors, to avoid friction on rolling or sliding surfaces, substantially as set forth.

We also claim the combination of the shaft sectors, and their adjusters, the whole being arranged, constructed and operating substantially as described.

WHEELS FOR RAILROAD CARRIAGES—A. R. Morrill, of Northfield, Vt.: I do not claim the interposition of wood between the hub and rim of railroad wheels,

Scientific American.

NEW YORK, FEBRUARY 26, 1858.

A New York Observatory.

Great hopes were at one period entertained that the Dudley Observatory, at Albany, would become the most distinguished on our continent, and an ornament to the great State of New York, but the quarrels between its superintendent astronomer and trustees have destroyed all such anticipations for the present. This may account for the incipient measures which have lately been taken for the establishment of such an institution in this city, hence Professor Mitchel's recent able lectures on astronomy as a movement towards securing such a result. This is not the first movement of the kind that has been made by the merchants of this commercial metropolis. Several years ago, an association was formed with the object in view of erecting an Observatory on that most conspicuous and eligible position, Brooklyn Hights; but, although there were quite a number of very respectable persons connected with it, no practical results followed. We are afraid that the same fate will attend the present impulses in this city to erect an Observatory, still we hope it may be otherwise.

It is generally admitted that an Astronomical Observatory is ot more importance to a maritime city than any other, and yet New York, which is the greatest seaport on our continent, is surpassed in spirit by Cambridge, Mass.; Cincinnati, Ohio; Albany, N. Y.; Ann Harbor, Mich., and Washington, D. C., all of which cities have Observatories. This is a stigma upon the most populous commercial city in America, and the sooner it is wiped out the better will it be for its credit. That a city with a population of six hundred thousand inhabitants, an immense aggregated capital, and a shipping interest only second to one other city in the world, should have allowed itself to be surpassed in scientific enterprise by some exceedingly small cities is almost incredible, but it is nevertheless true. Astronomy has done great things for navigation, yet New York which depends so much upon the commerce of the seas has done nothing for astronomy.

In regard to the movements already made for the erection of an Observatory in this city, some complications have sprung up which appear detrimental to the successful consummation of this enterprise. An eligible site has already been selected in the Central Park for the erection of the building; but the Chamber of Commerce has appointed a committee to get subscriptions, and endeavor to obtain a grant of land for another Observatory in the Battery Park. It is true that this latter one is merely contemplated for meteorological purposes and testing nautical instruments, but at the same time it must divert concentrated and unanimous effort from completing a first-class institution in the Central Park or any other situation in New York. Between these two movements the whole Observatory enterprise may be torn to shreds, hence we raise a warning voice against any cross or jarring actions that would tend to prevent the consummation of such a desirable project. It is our opinion that a unanimous effort should be made to erect and endow one first-rate Observatory, and not two, each below mediocrity. Meteorological observations and the testing of chronometers can be carried on in connection with astronomical observations in one place, as at Greenwich, England, more effectually and economically than in two establishments.

The friends of this movement should all meet, and decide at once upon a site for the structure, and wherever it may be selected, let parties and conflictions cease from that moment. Let all unite the energies of their minds, and contribute a moderate share of their substance, and the enterprise cannot fail to prosper. It is due to the credit of the city, and the merchants of New York, that the movements now making to secure the erection of such an institution be not mere *mock heroics*, but the fervent intentions of men who are determined to secure complete success.

Concrete Buildings and Roofing.

Our attention has been directed to an article on this subject in the Houston (Texas) *Telegraph*, by Mr. Thomas Affleck, of Washington, Miss. (the distinguished horticulturist), who informs us that this is a very important question to the growing State of Texas, and our opinion is solicited in regard to the best manner of building such houses, and the best kind of composition roofing which may be employed.

Concrete is a composition of mortar and gravel, or small stones, cemented into one mass. Good houses may be constructed of such materials, if sufficient time is allowed to elapse for the walls to become so dry before the floors and partitions are put in, that they may not afterwards crack. The cheapest and best method of erecting such walls is to put them up in sections—something like blocks—by laying the concrete in cradles, which are simply studs, set up at certain distances apart in the walls, to fulfil the office of guides or molds.

During severe rain storms, such walls are liable to be penetrated with moisture, and thus cause great dampness in the interior. To prevent this, they require to be coated on the outside with some impervious substance. A good composition is that of a coating of common lime whitewash, to which has been added three ounces of dissolved sulphate of iron (copperas) to the gallon. It should be put on cream thick with a common brush; when dry, it is very hard and adhesive, and of a pleasing cream color. This is only a preparative basis, as it is not a perfect water protective. On the top of this there must be applied a coat of linseed oil, which has been boiled two hours with four ounces of the flowers of sulphur (added cautiously) to the gallon. When this dries, the walls will be waterproof.

Composite roofing may be made in the same manner as concrete walls; but we are of the opinion that thin slabs composed of sand and lime (to which has been added a little fibrine or gelatine) molded and dried in the sun, would suit a better purpose. They should be laid down on a layer of mortar, and joined at the seams with common putty.

Hydraulic cement, which has been used in some instances for roofing, is not suited for this purpose, as it is liable to crack and disintegrate when it becomes very dry. Of course such a roof as that described requires to be finished with the sulphur oil varnish in the same manner as the concrete walls. As the days are very warm and the nights cool, in Texas, composition roofs which have pitch or resin as their basis, are not adapted to the climate; and almost every kind of composition roof is liable to crack, owing to the great amount of variable contraction and expansion. The material of which roofs should be composed for such a climate, ought to possess such an amount of cohesive strength as not to crack by the expansion and contraction to which it is subjected. The composition which we have described will be found very strong, as the gelatine (which may be coarse glue or bullock's blood) has great adhesive qualities.

As concrete walls are generally thick, they require a considerable period of time to elapse before they are finally plastered inside, in order to prevent dampness in the interior of the house.

If linseed oil is difficult to obtain for making the varnish described, any other vegetable oil, such as that derived from cotton seed, will answer nearly as well. This oil sulphur varnish is somewhat elastic, is unaffected with the weather, and possesses properties similar to those of vulcanized india rubber. Such roofing, we believe, is also quite applicable to strong frame houses, which have roofs of a very slight pitch. Houses constructed as here described, we doubt not, will be durable and comfortable, and may be erected at a moderate expense.

Fuel Saver for Locomotives.

The question before the Patent Office with regard to the origin of the diaphragm which has been introduced quite extensively in the smoke-boxes, has been decided by the issue of a patent, on the 1st inst., to Mr. Wm. S. Hudson, the superintendent of the locomotive works at Paterson, N. J. This diaphragm stands crosswise between the boiler and the smoke-pipe, and its effect appears to be to retard the current through the upper part of the smoke-box, and compel the gases to dive down and pass beneath it, when the engine is in motion, while the apertures are simply sufficient for the passage of the whole draught while the engine is standing still on account of the slower combustion in that condition. By this means the hottest gases are retained longest in contact with the boiler, and it is affirmed to effect a very sensible saving in fuel. We understand that the inventor does not intend proceeding against any of the railroad companies who have already introduced the invention, but is content to secure a monopoly of the construction of locomotives involving this feature in the future.

New Seeds for Farmers.

No class of men are more liable to be imposed upon than our plain, honest farmers. They seem to be made the subjects of special favor almost every season by all sorts of flaming advertisements about some wonderful seed, which, if sowed or planted, will be sure to double their crops, without half as much labor bestowed upon them, or expense for fertilizers, as other seeds. Somehow, it always happens that these seeds are sold at a most exorbitant price, and in many cases the cost for them is greater than that of the entire crops afterwards obtained. The great Rohan potatoes, which sold for a dollar a-piece for seed, were to multiply so fast and grow so large, that a bushel was to be hoed out from each hill. One season, however, sufficed to extinguish their character and the species also. Several other seed speculations have adorned the puffing annals of our country, and the pockets of those who originated them. We find that an attempt is being made to create another fever of this character at present out of a new grass called the *honey-blade*. The seed of this plant has been selling, according to the Ohio *Cultivator*, for no less than nine dollars per bushel in some places, while it is said to be nothing but German-millet under a new name. We know nothing of the merits of the new-fangled grass, but our farmers will do well to look out sharp before they suffer themselves to invest very deeply in this sweet-sounding seed.

Tunnels through Deserts.

A French engineer seriously proposes a scheme for turning the sands of the great African Desert into solid arched blocks for the construction of a tunnel extending the whole length of the sandy waste. The method proposed is to mold the sand by moisture into blocks of the proper shape, then fuse them by the heat of the sun's concentrated rays by means of a huge Archimedean burning mirror. The object of this tunnel is stated to be the protection of travelers from the desert simoons and sand storms, and to make Algeria the entrepot of the commerce of the Mediterranean with Africa. The scheme is a splendid one, but its foundation is laid in the sand, and we are warned that this is a foolish way of building.

Rotary-Engine Canal Boat.

A new steamboat for the navigation of the Erie Canal, was launched at Lupton's shipyard, Greenpoint, on the 8th inst. She was fully completed, and had steam on when she was launched, and soon after touching the water made a trip down the river. She is 98½ feet long, 17½ feet beam, 7 feet hold, and 6½ feet between decks. Another boat of rimilar size will soon be launched from Sneedon's ship-yard of the same place. They are owned by Barstow, Pope & Co., and furnished with Barrow's double-acting rotary engines, and have screw-propellers.

Pressure on Slide Valves.

MESSRS. EDITORS—In your issue of the 12th inst., my attention was attracted to the communication of Mr. Cameron, in which is stated his information of the results of experiments made at Paterson, N. J., which show that the pressure of a slide-valve is equal only to the sum of the area of the ports multiplied by the pressure in pounds per square inch, with an allowance for pressure on opposite side, &c.

As this has been, and still is, a mooted question, any experiment tending to throw light upon it would, doubtless, if published, prove acceptable and interesting to many of your readers. I would, therefore, in this connection, offer the result of an experiment made very recently by a friend of the writer of this, which goes far to establish the theory presented by you in your paper of January 15th.

The experiment alluded to, was made upon a locomotive engine having a 19-inch cylinder and 22 inches stroke, and provided with a variable exhaust, the nozzle of which, during the progress of the experiment, was reduced to three and a half square inches area, while working hard with one hundred pounds steam pressure. The following are the dimensions of the valve and ports:

Area of face of valve, 120 square inches,
" " steam-port, 15 " "
" " exhaust-port, 22½ " "

The slide-valve was subjected to an upward strain obtained by means of a frictionless piston of seventy square inches area, being coupled to the valve in such a manner, that during the entire throw of the valve, an uniformly perpendicular strain was maintained, (the pressure per square inch upon the valve and balancing-piston being equal,) yet there was not the slightest indication of leakage under the valve, even when the exhaust-nozzle was contracted to five and a half inches, and the area of the balancing-piston, viz., seventy inches, proves conclusively, that the pressure upon the valve is much greater than is due merely to the openings under the valve, and would seem to afford good reasons for the deduction that the slide-valve, when well-fitted to its seat, is subject to a downward pressure equal to the sum of the area of its face, multiplied by the pressure in pounds per square inch, making allowance for so much of the face of valve as is exposed to opposite pressure.

J. E. WOOTTEN.

Philadelphia, Feb., 1859.

[The experiments detailed by our correspondent confirm the opinion given in connection with Mr. Cameron's letter, as published in No. 23 of the present volume of the SCIENTIFIC AMERICAN.—ED.

ONE HUNDRED AND FIFTY PATENTS have issued since January 1st to inventors whose papers were prepared at the American and European Patent Agency Offices of MUNN & Co. This extraordinary success fully confirms the opinion expressed by Judge Mason, Ex-Commissioner of Patents, who, in a letter, states that while he was at the head of the Patent Office, more than one-fourth of all the business passed through their hands, and that he had no doubt the public confidence thus indicated was fully deserved. Inventors can rest assured that no other Agency in the United States has had an equal amount of experience in the examination of inventions, preparation of drawings, specifications, and attending to all the business necessary to secure the rights of inventors. Inventors who seriously intend to apply for Letters Patent, and consider their inventions worth anything, should be extremely cautious to have their papers prepared by experienced attorneys, and if they wish to consult with MUNN & Co., they can do so in confidence, by sending to them sketches and descriptions for their examination. Circulars showing how to obtain Letters Patent sent free.

Patent Claims

Issued from the United States Patent Office

FOR THE WEEK ENDING FEBRUARY 15, 1859.

Reported officially for the Scientific American.]

*** Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

BEE HIVES—George C. Aiken, of Nashua, N. H.: I do not claim the invention of a hive having a main chamber placed between a feeding chamber and one or more honey boxes.

But I claim the arrangement of the boxes, G G' H H', in the hive, so as to form, with the case thereof, the auxiliary or bell glass chambers, K K K K, in manner as described.

TREATMENT OF HIDES AND SKINS—Joseph Armstrong, of Woburn, Mass.: I claim the described improvement on my patented process of treating hides, or, in other words, I claim in combination with the application and use of a press, in connection with the impregnation of the hide with grease, by a peg-lined cylinder, or any equivalent means, the employment of scraps of hide, or other suitable absorbents, in the press, and against the edges and other necessary parts of the hides, and so as, during the operation of the press, to absorb the liquor from such edge or parts on or in which it would be likely to remain, as specified.

ARRANGEMENT OF THE FEED ROLLER IN WOOD-PLANING MACHINES—H. H. Baker, of New Market, N. J.: I do not claim the cutter wheel or disk, F, in itself considered.

Nor do I claim the adjustable gage, J, for they have been previously used.

But I claim arranging the feed roller, N, substantially as shown, to writ, connecting it with a vibrating shaft, K, box, L, slide, O, spring, P, and with necessary gearing, so that said roller may be kept to the work or moved out free from it without stopping the working or running parts of the machine.

[This is an improvement in that class of wood-planing machines in which cutters are attached to or project from the face of a rotating vertical wheel or disk. The object of this invention is to materially reduce the friction attending the working of this class of planing machines, as well as prevent the disfiguring of the work. Also to facilitate the cutting operation, and the placing of the feeding device under the complete control of the attendant, so that the device may be thrown in and out of gear with the work without stopping the working parts of the machine.]

HYDRANTS—Frederick H. Bartholomew, o New York City: First, I claim the combination of the valve, E, with the main valve, and its fixed valve seat, C, the whole constructed, arranged and operating substantially as and for the purposes described.

Second, I claim the arrangement of chamber, D D, within the trunk of the hydrant surrounding the seat of the main valve, having a waste passage at the bottom, substantially as and for the purposes described.

Third, I claim the arrangement of the waste passage, the waste plug, and rod, in combination, substantially as and for the purposes described.

MOLE PLOW—Moses Bales, of Big Plain, Ohio: I claim the adjustable mole plows, D d d' d'' g g' e, upon a cutting shaft, A, arranged and operating substantially as and for the purposes set forth.

REEFING AND FURLING SAILS—Charles E. Bishop, of Brooklyn, N. Y.: I claim, first, The employment of supplementary sheets to the topsails, and other upper square sails of a vessel, in order that said sails may be kept more "flat," and that the strain upon the ends of the yard may be lessened, as set forth.

Second, I claim constructing topsails in the manner described, that is to say, with supplementary sheets, clew-lines, and leech ropes, and with a central tackle, by the employment of which in due order, as set forth, the topsail may be reduced and secured in successive portions, substantially as described.

CARPET-STRETCHER—Isaac W. Bragg, of Cincinnati, Ohio: I claim first, The dog, E e, operating substantially as described, to attach the stretcher to that part of the floor next the wall, toward which the carpet is to be stretched.

Second, The combination and arrangement of the trip lever, F, for disengaging the dog, as set forth.

Third, The combination and arrangement of the apron, C, feet, B, and slides, G, operating substantially as described, in combination with the rake, H, to prevent the teeth, h, from grazing the floor.

Fourth, The combination and arrangement, substantially as set forth, of the stock, A, dog, E e, driver, H I E, and actuating worm, M, operating in the manner and for the purpose explained.

METHOD OF OPERATING YIELDING FEED ROLLERS—Joseph H. Brinton, of Westchester, Pa.: I claim a pair of feed rolls, one of which is yielding, and both driven by the same screw shaft, and in gear with it at all times, substantially in the manner described.

SKATES—Thomas W. Brown, of Boston, Mass.: I claim the rocker and angular heel or straight edge runner, made substantially in manner as described, and applied to the bearing plates or their equivalent, so as to be capable of being reversed with respect to the same, and used with either edge downward, as may be desirable.

I also claim the application of the heel plate to the heel screw, so as to be adjustable on, or with reference thereto, substantially in manner and for the purpose as described.

STOVES—James D. Bruner, of Alton, Ill.: I claim, first, Connecting and arranging with an oven which has no bottom, and between which and the passages of the products of combustion there is no communication, and the fire-box of the stove, air chambers or cells, as and for the purposes set forth.

Second, Combining with a detachable grate surface the detachable air cells or chambers, as described.

INSTRUMENTS FOR THREADING NEEDLES—S. S. Burlingame, of Warwick, R. I.: I claim the needle-threader consisting of an internally-barbed elastic pronged fork, substantially as described.

[This improved needle-threader is more particularly intended for threading worsted needles, which, owing to the narrowness of their eyes, and the large size and loose character of the thread used in them, are very troublesome to thread with the fingers.]

CULTIVATOR TEETH—William P. and Theodore H. Ford, of Concord, N. H.: We claim the described cultivator teeth, formed substantially as specified.

CUT-OFF VALVES FOR STEAM ENGINES—Adam Scott Cameron, of New York City: I claim the employment of the trip hinged valves, with their hook rods and appendages for operating them, or the equivalents thereof, substantially as described, in combination with the slide valve, substantially as described, for cutting off the steam in steam engines, as described.

I also claim, in combination with the slide and the trip hinged valve, operated substantially as described, the so-forming the seat of the slide valve relatively to the steam passages in the slide valve, substantially as described, as to admit the steam to the under face of the hinged valve and balance the pressure before they are opened, as set forth.

I also claim, in combination with the slide and trip hinge valves, combined and operating substantially as described, the employment of the adjustable cone, or its equivalent, substantially as described, to regulate the period of cutting off the steam, as described.

And I also claim the cone, or its equivalent, in combination with the eccentric tube, or its equivalent, substantially as described, as a means of adjusting the relative periods of closing the two valves, as set forth.

HARVESTERS—Daniel Clow, of Janesville, Wis.: I claim constructing the main supporting wheel thereof in such a manner as to form therein an outer and an inner zig-zag groove, but this I only claim when the said grooves have differently-proportioned reaches, and bear such a relation to the T-headed sliding bar, n, and the other parts of the machine which are connected with said bar and with the cutting apparatus, that the number of the movements imparted to the cutter bar can be varied at pleasure by shifting the bearings of the said sliding bar, n, from one position to another, substantially as set forth.

HAMES—Henry Cogswell, of Greenwich, N. Y.: I claim the application of the shifting slide to hames as they are now used, by means of which slide the point and position of the draft of the hames can be altered as desired.

PEN HOLDER—Benjamin Cole, of Brooklyn, N. Y.: I claim the construction of a pen-holder with three or more elastic shanks or fingers, so arranged that the spring of said fingers will hold the pen by pressing it against and under the shoulders, c, of two lateral fingers, and thus admit the introduction of, and be adapted to, pens of any ordinary size or thickness.

FIRE-PROOF FLOORS—John B. Connell, of New York City: I claim constructing a fire-proof foundation upon a series of wooden girders, for the reception of a flooring surface formed of boards or other suitable materials, substantially as set forth.

BREECH-LOADING FIREARM—Frederick Curtis, of Saugus Center, Mass.: When a breech slide is used in connection with the barrel of a firearm, I claim a movable breech, separate from the breech slide, and arranged and applied therein, so as to be adjustable to the rear end of the barrel, substantially in manner and for the purpose as described.

I also claim the arrangement of the priming nipple and the touch-hole thereof, with respect to the movable adjustable breech applied to the breech slide, as specified, or with respect to the same, and a primer arranged in the stock, substantially as explained, such arrangement being productive of advantages as before-mentioned.

RAILROAD CAR SPRINGS—Augustus B. Davis, of Philadelphia, Pa.: I lay no claim to any specific part or any particular device, when viewed as disconnected from the entire spring.

But I claim as a new and useful article of manufacture and merchandize the entire railroad car spring described, that is to say, a spring composed of a box or casing with a lid attached to the same by means of a bolt or bolts, the said box containing a number of spiral springs confined longitudinally between the bottom of the box and the lid, and retained in their proper position laterally by means of lugs, or other suitable devices, the said lid having a limited movement in the direction of the springs, but having no lateral movement independent of the box, so that each spiral spring may be independent of the other, although the whole act in combination, the entire spring thereby retaining its elasticity, even should one or more of its spiral springs be broken or damaged.

SHOE LASTS—John C. F. Deecken, of New York City: I do not limit myself to the particular shape of the endless chain, the wheels, or the knives.

But I claim the endless chain or band in combination with a knife or knives, operated in the manner and for the purpose substantially as described.

UMBRELLA FASTENINGS—Charles DeSaxe, of New York City: I am aware that catch bolts operated by means of springs, and having knobs or projections to depress them, have been used to support and fasten hinged or jointed rods, such rods being also connected by tubular hinged joints, and therefore I do not claim, generally, the use of bolts to fasten such rods, or the use of a tubular hinged joint to connect them.

But I claim the arrangement of the bolt, a, substantially as described, operating without springs, and by a double or sliding and rotating motion in combination with the tubes or sockets, B B, for the purposes set forth.

MODE OF SQUEEZING AND STRAIGHTENING TOBACCO—Martin D. Elsom, of Howardsville, Va.: I claim squeezing and straightening bundles of tobacco, with a view of their being afterwards "struck" by passing them through a straightening and compressing mechanism, substantially such as represented.

CHURN—John U. Fiester, of Winchester, Ohio: I claim the adjustable dasher, constructed with two blades, D, yoke spring, E, cross tie, F, with slots, a, and pins, b, together with holes, f, and air cavities, d, operating substantially as set forth and described.

WRENCH—Daniel P. Foster, of Shelburne Falls, Mass.: I claim making the hinge joint between the stationary and movable jaw of the wrench at a, viz., by the projections, c, on the stationary jaw, and the depression, e, in the washer that is on the shank of the movable jaw, for the purpose of allowing the movable jaw to change its position in relation to the stationary one, as set forth, and for the purpose explained.

SHACKLE OF TELEGRAPH CABLES, &c.—George Gilmour, of Chelsea, Mass.: I do not claim a chain shackle such as I have heretofore patented, as made with a spring-forked pawl or catch, to operate with a friction roller.

But I claim the telegraph cable or rope shackle, as constructed with one or more jaws, and mechanism to operate the same, substantially as described.

I also claim combining either the wing, l, or the knife, m, or both, with the shackle, so as to operate therewith in manner and for the purpose or purposes as specified.

CORK-CUTTING MACHINE—George Hammer, of Philadelphia, Pa.: I do not desire to confine myself to the described construction and combination of the parts in minutiæ.

But I claim the described arrangement of guiding rollers, O and P, and sliding wedge, S, or their equivalents, in combination with the stop, s, the whole being constructed and operating substantially in the manner and for the purpose set forth.

HORSE-POWER EQUALIZER—Gorges Hely, of Laporte, Ind.: I claim first, Connecting the eveners, G I, by a rope or chain that passes over a pulley at the center of the shaft, A, substantially as described.

I also claim, in combination with the eveners, the method of connecting the points or parts to which the horses are hitched, and by which they draw, by means of a system of ropes or chains and pulleys connected with the draft bars, substantially as described.

ROTARY ENGINE—Samuel Huse, of Chicago, Ill.: I claim the cams, E E2, with their steam and exhaust ports, in combination with the heads, m m2, pistons, n n2, and cylinder, C, operating in the manner substantially as set forth.

METHOD OF LIGHTING GAS BY GALVANIC ELECTRICITY—W. W. Hopkins, of Amelia, Ohio: I do not claim broadly the letting-on of gas to burners by electricity, or the lighting of gas by heat generated in a platinum wire by a current of electricity passing through it.

But I claim the arrangement and combination of the hollow permanent magnet, A, valve chamber, C, coil, F, electro-magnetic valve, E, and tube, D, as and for the purpose shown and described.

[A gas-burner is combined with an electro-magnetic seat in this invention, to control the letting-on and shutting-off the gas; and there is also a certain arrangement of the conducting wires of an electric circuit in which the electro-magnetic valve is placed, by which a piece of platinum constituting a part of the same circuit, and occupying a position over the burner, is caused to be heated by the same action by which the valve is opened, and so ignite the gas.]

HARVESTERS—Moses G. Hubbard, of Penn Yan, N. Y.: I claim connecting the cutting apparatus with the machine by an adjustable attachment, which can be changed from a free hinge to a joint, rigid in one direction or in both directions, for the purposes and in the manner substantially as set forth.

I also claim the employment of a raising lever of the second order with a gradually increasing purchase, by which it is made self-sustaining.

And I also claim keeping the lever in a convenient position for operation by the hand of a driver, by means of a spring, substantially as and for the purpose specified.

ELEVATOR FOR WINDOW SASHES—William Huey, of Christiana, Pa.: I claim the arrangement and combination of the rods, E E, pawls, f, ratchets, d'', loose drums, c c', sliding shaft, D, pins, d c, and cords, b b, as and for the purpose shown and described.

[The object of this invention is to obtain a simple elevating device, which may be so applied to the window that either sash may be elevated and lowered as desired, and retained at any desired hight. The invention is designed to facilitate the raising and lowering of the sashes, and supersede the weights and appliances that have been previously used.]

APPARATUS FOR COMPRESSING ELASTIC FLUIDS—John Jameson, of 10 Catharine Terrace, Gateshead, County of Durham, England. Patented in England March 13, 1858: I claim the compression and expansion of aeriform fluids by an apparatus of the nature described, the same consisting of a combination and arrangement of a series of cylinders or vessels, perforated or tubular pistons, induction and connecting pipes, valves, a reservoir, a rotary shaft, and means of heating, or heating and cooling the cylinders or vessels, the whole being constructed and made to operate in manner and for the purpose substantially as described.

TAPE PRIMER FOR FIREARMS—Theodore T. S. Laidley, of U. S. Army: I claim the combination of two different materials in the manufacture of tape primers, one a metal or like substance, to receive and protect the percussion powder, into which it can be firmly pressed, and the other to connect the former into a series, something that can be easily severed by the edge of the hammer.

ADJUSTABLE SIGHT FOR FIREARMS—Richard S. Lawrence, of Hartford, Conn.: I am aware of the construction of a sight by connecting an elevator with the barrel, or with a fixed and inflexible base, firmly secured to the barrel by a hinge, socket, or other joint, all of which I disclaim.

I claim the application of said hinge joint to the spring base and elevator, constructed and arranged substantially as described.

BURGLAR ALARM—G. A. Lilliendahl, of New York City: I claim the arrangement of the slide, C, and plate, A, with the lips, r and b, so that a cartridge placed on the slide and between the two lips is exploded by pushing the slide in, substantially as and for the purpose specified.

[This improved burglar alarm can be applied to a door or window, and the moment either are interfered with so as to press upon a slide, the slide discharges a cartridge filled with some highly explosive material.]

RAILROAD SIGNAL LANTERNS—S. N. Lennon, of Deposit, N. Y.: I claim suspending within the lantern, A, at two opposite sides, and over or behind the colorless glass plates, a a, the frames, C C, provided with the colored glass plates, c d, and arranged as shown, or in an equivalent way, to operate as and for the purpose set forth.

[A signal switch lamp was patented by this inventor July 27, 1858. The present one is an improvement on it, and is designed to simplify, to a considerable extent, the patented article, so as to reduce the cost of construction without in the least detracting from its efficiency, but on the contrary rendering it less liable to get out of repair.]

SEWING MACHINES—Clark Marsh, of New Milford, Conn.: I claim the ring gage, D E, with the pins, c c c, spring, d, and cam, e, or their equivalents, constructed and applied in combination with the slide ring, B C, substantially as and for the purpose set forth.

[The sewing machine patented by A. B. Wilson June 15, 1852, is the basis of this improvement, which is also applicable to all machines in which a similar combination of a rotating hook for extending the loops of the needle thread, and a bobbin for carrying the locking thread are employed. It consists in a gage applied to, or in combination with, the slide ring, by which the bobbin is confined in proper relation to the rotating hook, for the purpose of adjusting the ring to permit exactly the required amount of play to the bobbin between the face of the hook and the bobbin, thereby obviating the difficulty which, owing to the difference in the thicknesses of bobbins, has heretofore been experienced in the adjustment of the ring in case of a bobbin being changed.]

PRESERVE CANS—James F. Martin and Henry C. Nicholson, of Mount Washington, Ohio: We do not claim, broadly, the construction of a hermetically-sealed fruit or provision can.

Nor do we claim coating vessels with vitrious enamel, both being well known and in common use.

But we claim as a new and useful article of manufacture, a fruit or provision can, to be hermetically sealed, constructed of metal, lined on the inside with a vitrious enamel, capable of withstanding the action of the acids contained in the fruits, &c., to be preserved, substantially in the manner set forth.

We also claim the combination of a metallic cover, vitriously enameled on the inside, with a fruit or provision can, substantially as set forth.

STOVES—David N. Martin, of Lawrence, Mass.: I claim the arrangement of the air register, G, at the upper part of the ascending discharge flue, E, and with respect to the direct damper, F, substantially as described and represented, the ascending discharge flue being arranged between the two descending flues of the stove case, substantially as set forth.

WINDMILLS—John M. May, of Janesville, Wis.: I claim, first, A standard, D, arranged in the head, a, of the frame-work, and so constructed that it serves as a guide for the central vertical shaft, B, receptacle for gear, E, or gear, E', or gear, E2, support and axis for the horizontal axle or shaft of the wind wheel, and as a guide for the sliding thimble, O, substantially as and and for the purposes set forth.

Second, Furnishing each of the stems of the sails with a cogged segment, for the purpose of revolving the sails on their radial axes, the segments being operated by cogged rack bars attached to the sliding thimble, K, substantially as and for the purpose set forth.

Third, The arrangement consisting of the main governor arm I the forked adjusting rod, N, connected with each other, for the purpose of operating the thimble, O, in regulating or controlling the wind wheel, as set forth.

Fourth, Providing each of the stems of the sails with a weighted arm, projecting forward of the front surface of the sails, for the purpose of governing the velocity of the wind wheel by regulating the obliquity of the sails to the wind current, substantially as set forth.

Fifth, The covering made in two sections which are constructed and arranged as shown, the tubular section T, revolving with the wind wheel independently of section S, when the wind wheel moves in the path of a vertical circle, and with it when the wind wheel moves in the path of a horizontal circle, as and for the purposes set forth.

WINDMILLS—John M. May, of Janesville, Wis.: I claim, first, The peculiarly-constructed stationary central vertical shaft, A, in combination with the peculiarly constructed revolving tubular shaft or hollow column, B, the shaft, A, providing axes for the wind wheel, and the tubular column, B, to revolve upon in the paths of horizontal circles, and serving as a support and guide of the structure of the wind wheel, and the tubular column, B, serving for receiving the power of the wind wheel and transmitting it to machinery, substantially as set forth.

Second, Enlarging the axle, C, at its shoulder, in the form of a hub or pipe box, c, that the axis, d, of the shaft, A, may pass up directly through it, so that the center of the axis of the shaft, A, and axle, C, intersect, and in themselves form vertical and horizontal center bearings within the angle formed by the gear wheels, D and E, and the shaft, A, and axle, C, also serve as bearings for the gear wheels, substantially as and for the purposes set forth.

Third, The combination of a horizontal lever, S, the vertical governing rod or bar, Q, guide bar, R, and thimble, G, on the tubular column, substantially as and for the purposes set forth.

Fourth, The employment of a revolving conical cover, for the purposes of protecting the mechanism of the wind wheel, and dividing the wind current at the front and center of the wind wheel head and guiding it upon the sails, and relieving the weighted elbow levers used for revolving the sails on their radial axes of the countervailing influence of the wind current, so as to enable them to act by centrifugal force with certainty in governing the velocity of the wind wheel, substantially as set forth.

CRACKER MACHINE—John McCollum, of New York City: First, I claim in combination with the carrying apron, B, the roller, A, with its doffer, F, or the equivalent thereof, and the supporting or feed roller, D, and supporting table, C, or their substantial equivalents in the combination the rollers and apron moving with simultaneous intermittent progressive motion, the whole being so arranged, and operated, substantially as set forth, described, and shown, so as to progressively flat pellets of dough suitable for crackers, ship biscuit, and similar articles, placed in proper order upon the apron, and at suitable distances from each other to permit of the extension of diameter resulting from the operation, as they pass under the roller, A, without materially disturbing the order of their arrangement on the apron.

Second, I claim the reciprocating docker in combination with the carrying apron, bed, and stationary perforated clearer plate, substantially as described, and substantially for the purposes set forth, and with or without adjustable springs in combination therewith, to make yielding pressure at the docking point, substantially as described.

Third, I claim the flatting apparatus, as set forth and described in the specification and in the first claim, when combined with or used in combination with a docking apparatus, such as is set forth and described in the specification and in the second claim, or the substantial equivalent thereof, when used, combined and operated for the purpose of docking flatted pellets of dough for crackers as they are progressively brought to and under the docker from the flatting apparatus, without materially disturbing the order of their arrangement on the apron, substantially as set forth and described.

DOVETAILING MACHINE—W. A. McDonald, of Mott Haven, N. Y.: I claim the cutter-head, D, formed of a screw thread, g, on a cylinder, f, the screw thread being provided with cutters, h, and arranged substantially as described and for the purpose set forth.

[This invention consists in a cutter-head constructed in a novel way, and used in connection with an adjustable bed, so as to form one portion of dovetail joints by a continuous operation in a rapid and perfect manner.]

PRINTING PROCESS—Gordon McKay, of Boston, Mass.: I claim the combination of an impression cylinder and nippers, operating in conjunction with a blast pipe or mechanical means for producing an inequality of atmospheric pressure on the sheet when released by the nippers, and as said sheet is forced onwards by or with the impression cylinder in its rotary movement, substantially in the manner and for the purpose set forth.

REPEATING FIREARM—Henry H. McKinney and Frederic Goth, of Biddeford, Maine: We do not claim a firearm constructed not only with its nipples or primers arranged one in advance of the other on the barrel, but with a lock having a hammer or striker to operate with each nipple or primer.

But we claim the combination of two strikers, one trigger, and a mechanism which will not only enable each striker to be set to and maintained at full cock, but by retraction of the trigger, will cause both strikers when at full cock, to be discharged or set free consecutively, so as to be forced against their respective nipples, or the percussion caps, or priming thereon, or the equivalents of such, and cause explosion of the priming of the charges in the order as specified.

We also claim the specified application of the lock case with respect to the barrel in combination with the construction and arrangement of the trigger-rod or slider in separate parts, and in such manner as to be capable of being locked together, and of being unlocked or disconnected under circumstances as specified.

We also claim the application and arrangement of the two main springs of each striker in the lock case, as explained.

We also claim the combination of the trigger slide, F, and the lever seare, arranged and operating with respect to the two strikers, as specified.

CRUETS OR BOTTLES FOR CASTORS—J. O. Mead, of Philadelphia, Pa.: I do not desire to confine myself to the use of four bottles, or cruets, only, inasmuch as more or less than that number may be adapted to each other, and comprised within a small compass in the same manner as the four.

But I claim constructing the cruets or bottles of cruet-stands, so that they may be adapted to each other and to the stand, substantially as set forth and for the purpose specified.

PREVENTING FRICTION ON AXLES—T. S. Minnis and T. S. Minnis, of Meadville, Pa.: We claim the employment of sectors, to avoid friction on rolling or sliding surfaces, substantially as set forth.

We also claim the combination of the shaft sectors, and their adjusters, the whole being arranged, constructed and operating substantially as described.

WHEELS FOR RAILROAD CARRIAGES—A. R. Morrill, of Northfield, Vt.: I do not claim the interposition of wood between the hub and rim of railroad wheels,

when the wood is arranged in tapering block, the grain of which runs radially of the wheel; neither do I claim any wheel having a wrought iron rim or tire, as such wheel would by no means attain the ends which I have in view.

But I claim a wheel for railroad purposes, having a cast-iron hub and rim, and a body of wood formed of double plates, as described, and secured to the hub and rim by bolts, as set forth.

RETORTS FOR DISTILLING OILS FROM COAL—John Nicholson, of Alleghany, Pa.: I do not confine myself to any particular number or to any peculiar form of the agitators, or to any number of shafts armed with agitators, as three or more shafts may be arranged as represented in Figure 5, marked m, nor do I confine myself to any particular manner of arranging the agitators or the shaft or shafts neither do I claim a revolving or oscillating retort.

But I claim, first, Furnishing retorts used for extracting the oleagenous matter from coal and other substances with agitators, or a shaft or shafts, armed with agitators, as described and for the purpose set forth.

Second, In so arranging the supply and discharge openings and the exit pipes, in connection with the trunnions, that when one portion of the retort is weakened, by the action of the fire, another part may be exposed to it, as described and represented.

MACHINE FOR MAKING BULLETS, &c.—Edw. Nugent, of Brooklyn, N. Y.: I claim, first, The revolving self-cutting mold, E E, working in contact with the mouth, D, of the lead kettle, through which the cavities, e e, are supplied with metal, substantially in the manner and for the purposes set forth.

Second, I claim the end motion of the two series of mold rings, E E', and the opening and closing of the several rings in one series, while the cavities in the other series are being filled substantially as set forth.

Third, I claim the tumbling bars or their equivalents, operating substantially as described, by which a concussion is produced when the mold rings are opened, and allowance is made for any obstruction between the rings when closed, as set forth.

CARPET SWEEPER—N. B. Pratt, of Deep River, Conn.: I claim the arrangement of the rotating brush, on adjustable swinging lever bearings, G, in combination with an elastic driving belt, H, substantially as and for the purposes set forth.

[By this invention the brush can be adjusted so as to compensate for any wear, and is held down to its work with a greater or less spring pressure, and yet is capable of rising and falling automatically, so as to adapt itself to any undulations of the carpet or floor. This is a second patent on carpet sweepers secured by Mr. Pratt through our agency, and we think he has now got just the thing for the ladies.]

VULCANIZING CAOUTCHOUC—C. S. Putnam, of New York City: I claim the combination of the boiler, A, the vulcanizing chest, B, and the condensing chamber, G, constructed arranged and operating substantially in the manner described, the same constituting a portable automatic apparatus for the purposes specified.

HARVESTERS—B. F. Ray, of Baltimore, Md.: I claim the conical roller, in combination with the cam groove, for actuating the means that operate the cutter bar.

WINDLASS—Jesse Reed, of Marshfield, Mass.: I claim the combination of the windlass drums, D E, pawls f g, with the wheel, F, and knee or sampson post, H, whereby the central wheel, F, is supported on both sides, and the windlass rendered more simple and sure in its action, substantially as described.

ROCKET MATCH BOX—A. Roesler and Chas. Frey, of Warsaw, Ill.: We claim, first, The cylinders, A and B, provided with strips, a and c, and spring, d.

Second, Tool, E, with spring, O, the whole being arranged substantially as described for the purpose specified.

LOCKS—A. A. Richards, of Urbana, Ohio: I claim the arrangement of the wheels, a and a', with their rings, x x', and the spring, e, and slides, c, for producing friction between them, and the arrangements of the bolts, B, and its stems, o and o', and the use of the hands, h and h', and dial, d, by which the principle of the above friction wheels and rings is applied to this lock, as described.

And I also claim the arrangement of the eccentric, E, brake, k, brake lever, L, check-bolt, C, and catch l, by which the pressure of the stems, o o', on the rings, x x', simultaneously with the revolution of the hands, h h', and rings x x', is prevented, as described.

And I further claim the manner or arrangement above described of revolving the dial, d, by removing the screws, L L, as detailed.

STEAM ENGINE—Gelston Sanford, of Poughkeepsie, N. Y: I claim the inside head, H, in combination with the crosshead, E, and elongated cylinder, A B, when constructed and operated in the manner and for the purposes specified as an article of manufacture.

MODE OF SEALING LETTERS, &c.—Joseph Saxton, of Washington, D. C.: I am aware that impressions have been made upon fusible metal for the purpose of copying devices: this I do not claim.

But I claim the process of sealing, by means of fused metals or alloy, whereby the impression is made and the seal secured simultaneously, substantially as described.

MACHINE FOR PUNCHING RAILWAY BARS—George Shone, of St. Louis, Mo.: I do not claim, broadly, the employment or use of cams for operating punches, for cams are a well-known mechanical device, and have been previously used for the same and analagous purposes.

But I claim the arrangement and combination of the recessed gate, H, triple cam shaft, C, clamping screws, J K, and adjustable buttons, M, substantially as and for the purpose shown and described.

[A sliding gate is fitted in a suitable framing, and provided with punches operated by means of cams and yokes; the punches work over a steel bolster, and the gate is recessed to receive the rail. By this arrangement rails can be punched at both sides simultaneously and very expeditiously.]

CONVERTING RECIPROCATING INTO ROTARY MOTION—E. A. Smead, of Tioga, Pa.: I claim the fly-wheel, A, with the adjustable wrist-pin, b, attached in connection with the slotted bar, or rod, B, and rod, C, the whole being arranged to operate substantially as and for the purpose set forth.

[In this invention, there is an adjustable wrist-pin attached to a fly-wheel, and fitted within a slotted vibrating arm which has a rod pivoted to it at right angles; these parts are so arranged that rotary can be converted into reciprocating motion with the least possible absorption of power by friction.]

METHOD OF BURNING THE THREADS ON WOODEN SCREWS—Patented in England January 1, 1859: T. Briggs Smith, of New York City: I claim the application of a screw made on a bung, and another screw made in the stave corresponding with that upon the bung, both being formed by burning. This bung is to be used for all casks or vessels made of woods for liquids.

I also claim forming a screw, by burning on a bung or stopple, to be used in any vessel made of any material, whether wood, metal, glass, or other material.

FLY TRAP—S. W. Smith, of Brooklyn, and Hubbard Bigelow, of New York City: We claim, first, The combination of the endless web, or apron, B, with the plate or scraper, H, and the rollers, C C' and F, operated as described for the purposes set forth.

Second, The combination of the endless web, B, with the roller, F, and the pan, G, in the manner and for the purpose described.

SEWING MACHINES—Watson Snyder, of Newark, N. J.: I do not claim the employment of a surface arranged obliquely to the face of the cloth table or plate, to turn the edges of fabrics in sewing machines. Neither do I claim the attaching of the whole binding guide to the food or pressure pad, as that it may be caused so rise and fall therewith, as that has been already patented by O. G. Boynton, June 1, 1854.

But I claim the combination of the fixed upper guide, C, for the under edge of the binding, the fixed but adjustable guide D, for the edge of the folder of the binding, and the elastic plate, E, operated upon by the pressure pad, or foot, the whole applied and operating substantially as and for the purpose set forth.

[This invention consists in the combination, with two fixed guides (one for the under edge of the binding, and one for the fold) of an elastic plate, operating in combination with the foot or pressure pad, substantially as described, so as to adapt itself to different thicknesses of binding, and of the materials to be bound for the purpose of effecting the gradual turning over of the binding on the upper surface of the material to be bound, and of holding the same flat as it approaches the foot-piece or pressure pad.]

DEFECATING AND CLARIFYING SACCHARINE JUICES—John Spangenberg, of New York City: I claim the application of hydrated oxyd of tin, prepared with sulphurous acid, substantially as set forth, for the purpose decolorizing or bleaching and defecating syrups, saccharine solutions and liquids from sugar cane and other saccharine and vegetable juices, whether the same be used alone or in combination with aluminum, as set forth.

CHURN—Oren Stoddard, of Busti, N. Y.: I do not claim, broadly, the employment or use of a weight in connection with the gearing, escape wheel and pallets, applied to a churn for operating the same, irrespective of the particular manner of adapting the power to the churn, as shown and described, for such parts form a portion of a simple clock movement, and is a well-known device.

But I claim the combination of the crutch, M, with the interior of the churn-box, N, so that the lower end of the said crutch shall act as and constitute the dasher, substantially as described,

[This machine derives its motion from a weight, so that it may be called an automatic butter churner.]

MOP-HEAD—Luke Taylor, of North Springfield, Vt.: I do not claim, separately, any of the parts described.

But I claim as an improved article of manufacture, a mop-head having a loose collar, C, provided with a screw thread, and otherwise made as described.

[A jaw is secured permanently to the end of the handle of the mop-head, and a screw is left fitting loosely on the handle, so that it may turn freely thereon, and actuate a nut to which a movable jaw is attached. The movable jaw, by turning the nut, being made to secure or clamp the cloth in the head, or free it therefrom.

ICE TONGS—John Tyler, of Providence, R. I. I claim the combination of a pick and cutter, or either of them, with a pair of ice-tongs, by forming or attaching the same upon or to the back of either leg of the tongs, substantially as described, thus making an instrument of novel character.

[The ice-tongs that form the subject of this patent have a pick or cutter or both combined with them.]

RAILROAD SIGNAL LANTERNS—J. L. Wager, of Depositt, N. Y.: I am aware that switch lanterns have been previously devised, in which colored glass plates have been operated or certain parts, so adjusted by the movement of the switch-bar, or lever, that different colored lights are shown, to indicate the position of the switch. I therefore do not claim, broadly, an automatic switch lamp.

But I claim the lantern case, B, provided with the colorless glass plates, f f', and loosely attached, or suspended to the rod or shaft, O, which is connected with the switch bar or lever, A. The case being provided with the oscillating or partially rotating frame, C, containing colored glass plates, and connected with the rod or shaft, o, by means of the arm, n, the whole being arranged substantially as and for the purpose set forth.

[This switch lamp shows the different colors at the different positions of the lever that operate it, but the lamp always remains perpendicular at whatever angle the switch lever may be, thus saving the lantern from being burned and smoking the glass, as is the case with others.]

CLOTHES-FRAME—Lawrence B. Waterman, of Chicago, Ill.: I claim the combination of the stationary top-support, B, with the movable parts, D, G, when operated through the segmental racks, e, f, and arranged for the purpose of forming a tipping clothes-drier frame, substantially as set forth,

METHOD OF LOCKING AND SUPPORTING THE PANELS OF FIELD FENCES—Elisha West, of Ogden, N. Y.: I do not claim panels constructed as described, either with battens alternately on opposite sides, or entirely on one side of the rails, nor do I claim a triangular or brace support for the panels of a fence; but I claim the combination of the panels and the triangular brace or jack, G, constructed as described, when so arranged in connection with the recesses, e, e, of the panels, that by drawing the adjacent panels in opposite directions, till the jack, G, shall enter said recesses, e, e, the sections of the fence shall be securely locked together, in the manner specified.

COATING METALS WITH TIN—Carl Winzen, of Albany, N. Y.: I claim, subject to the explanations and disclaimer, the solution composed of the ingredients in substantially the same proportions, applied to accomplish the process of tinning, and used substantially in the manner described.

SECURING GARMENTS TO HOOKS—Gilman Woodward and Franklin S. Hathaway, of Keene, N. H.: We claim, First, Securing the hook, B, to the vertical sliding plate, C, C, in the manner and for the purposes described and set forth.

Second, The manner of operating the arm, F, in combination with the movement of the hook, B, and sliding-plate, C, C.

Third, Arming the hook, B, and the arm, F, at their points of contact with movable spurs, in a manner and for the purposes described and set forth.

Fourth, The tumbler, S, when operated as described, or otherwise to produce the same effect as specified and set forth.

ELASTIC-TOYS—Lucius P. Porter, (assignor to the New York Rubber Company), of New York, N. Y.: I claim the combination of a reed or other speaking device, with a hollow, elastic toy made of caoutchouc or gutta-percha, or their compounds for acting together, the former by the latter, substantially as specified.

And I further claim the manner described, of securing the reed frame to the toy by grooving the frame on its edges or periphery, and inserting it in a hole in the toy, so as to be clasped in the groove by the edges of the elastic material in which the receiving aperture is made.

CORN AND COB-MILL—John De Frain, (assignor to William Callahan and William Grant), of Philadelphia: I claim, First, Making the hopper, N, of the crusher, M, adjustable on the shell of the same, so as to present to the ear of corn either the corner edge, 7, of the hopper, N, or the inner edge, 8, of the shell, M, as occasion may require, substantially in the manner and for the purposes set forth and described.

Second, I claim, the carrier, K, the inverted cup, K', and its adjusting bolt and nut, v, and arch-piece, w, in combination with the hopper, C, and spindle, F, the same being constructed and arranged together, substantially as shown, and operating together in the manner and for the purposes described.

Third, I claim the combined arrangement of the scrapers, S, S, on the bottom of the rotating disk, E, the annular groove, P, in the diaphragm, A', and the outlets and tubes, L, L, the same operating together, substantially in the manner and for the purpose set forth and described.

Fourth, I also claim the combined arrangement consisting of the outlets, L, L, and the opening, u, through the diaphragm, A', the same operating together with the rotary disk, E, in the manner and for the purpose specified.

WASHING MACHINE—Thomas A. Dougdale, of Richmond, Ind., (assignor to William M. Reed) of Newcastle, Ind.: I claim combining and arranging the inclined planes, F, F, the plate, H, and pins, I and J, J, with the double-inverted inclined-planes, D, D, rollers, E, E, E, E, E, E, E, and wash-boards, A, A, the whole being constructed, arranged and operated substantially as described, and for the purposes set forth.

PAILS—Josiah J. Dutcher, of Brooklyn, N. Y., (assignor to Noah Mosher), of Norwalk, Conn.: I claim The pail constructed of the body, A, and jacket, B, of the materials specified, to form a new and useful article of manufacture.

[The object of this invention is to obtain a pail that will be free from the objection attending wooden pails, to wit. the disagreeable taste communicated to the water by the wood or the paint upon it, when used as a water-pail, and also the unpleasant odor they emit from the porous nature of the wood when they have been used as chamber pails or for analogous purposes. The invention consists in having the body of the pail constructed of porcelain pottery or glass or other similar non-absorbent substance, and enclosing the body in a sheet-metal jacket to serve as protection.]

SHEET-METAL ROOF—Ezra Pollard, of Albany, N. Y., (assignor to himself and Joshua Gray, of Westfield, Mass.: I do not claim, broadly, the attachment of the sheet-metal coverings of roofs and other portions of buildings by interlocking connections, which have the metal free to move in all directions, as I am aware that slotted plates, set up edgewise, have been attached to the roofs in pairs, to receive small bars attached by loops or eyes, to the metal covering, making a much less simple contrivance than any interlocking strips.

But I claim, First, Securing the edges of sheet-metal coverings of roofs and other portions of buildings by means of strips of india-rubber, b, united to the said edges by lap-joints, and nailed to the building substantially described.

Second, The interlocking metal strips, f, g, formed, applied, and operating substantially as set forth.

[The object of this invention is to secure sheet-metal coverings or roofs and other parts of the exteriors of buildings, as to provide for their expansion and contraction by changes of temperature, and also to provide for the shrinkage of the wood-work. This is achieved by the use of india-rubber attachments and joints formed of transverse strips of metal.]

CONVERTING RECTILINEAR INTO ROTARY MOTION—George W. Richardson and Robert Glover, of Grayville, Ill., (assignors to themselves and John J. Tanquerry), of White County, Ind.: We are aware that segment-wheels have been used to operate a working-frame, and *vice versa*, hence, we do not claim this device.

But we claim the arrangement of the rocking-racks, K, K, in combination with the segment-wheel, I, substantially as described for the purposes set forth.

ROCKING-HORSE—Arad Woodworth, 3d, of Boston, and Daniel Woodworth, of Warren, and M. T. Hitchcock, of Springfield, Mass., (assignors to Arad Woodward, 3d and Daniel Woodworth), aforesaid: We claim as a new article of manufacture, a rocking-horse, consisting of the head and neck of a horse, made as in the ordinary rocking-horse, combined with a hollow box or cradle, so that the child can be placed therein, and which rocks longitudinally, thereby uniting the advantages of a rocking-horse and cradle, and preventing the liability of accidents to the child, by falling, as set forth.

RE-ISSUES.

ARRANGEMENT OF MEANS FOR WORKING STOPPING CHAIN CABLES—Thomas Brown, of London, England. Patented July 25, 1854, ante-dated April 20, 1847: I claim the faring and radial-flanched annular recess in the capstan of working a cable of any given size, or cables of several different sizes, the same being constructed and operating in the manner and for the purposes substantially as set forth.

I also claim, in combination with a capstan or windlass which is capable of working a chain-cable when only a partial turn is taken, a set of removable rollers so arranged in relation to the capstan, the deck-pipes, and hawse holes, that either a part or starboard chain cable can be continuously hove in by means of said capstan and rollers, or can be directly run out of its locker without any previous overhauling, substantially as set forth.

I also claim the within-described arrangement of bow-stopper and after-stoppers, whereby more cable can gradually and controllably be given to a vessel whilst riding heavily at anchor, substantially as set forth.

I also claim the clearing-guide in combination with the annular recess of a capstan or windlass which is capable of working a chain-cable where only a partial turn is taken, for the purpose and in the manner, substantially as set forth.

BANDAGES—N. Jenson, of Washington, D. C. Patented December 14, 1858: I claim the extension spring-frame, s, constructed and arranged substantially as described, so that when the sides are closed by the pressure of the limbs the rear of the frame will remain open for the purpose as set forth. I also claim the combination with the exterior frame, or when constructed and arranged substantially as described for the purpose set forth.

MACHINE FOR MAKING NUTS, WASHERS, ETC.—James Wood, of Philadelphia, Pa., (assignee through mesne assignments of William Kenyon, of Steubenville, Ohio. Patented October 14, 1851: I claim, First, Making nuts for bolts by subjecting the blanks of which the nut is to be found, at a welding heat, to compression between swages or dies in a close die or matrix and punching the eye of the nut during the continuance of such pressure for the purpose of welding up any imperfections in the iron and giving a symmetrical shape and smooth finish to the nut, and of preventing any injury to the nut which it might suffer by the passage of the punch through it, if it were not thus restrained by the sides of the die-box, and forcibly compressed between the dies.

Second, The use of a die-box closed at the sides for surrounding the nut, and sustaining its sides while it is subjected to pressure, substantially in the manner described.

Third, The combination of the compressing die, P and T, with the die-box, M, for the compressing of the nut while it is sustained at the sides, and thus welding up any imperfections in the iron, and compacting its fiber so as to give strength as well as exterior finish and symmetry to the nut.

Fourth, The combination of the punch, L, with the die-box, M, and compressing-dies, P and T, for the purpose of compressing, confining, and restraining the opposite forces of the nut during the passage of the punch through it; and thus preventing any injury to the nut during the process of punching, and also for the purpose of ensuring the making of the bore of the nut in the proper relative position to its upper and lower surfaces.

Fifth, The combination of the die-box, M, the compressing dies, T and P, and punch, L, constructed and arranged substantially as described, for the purpose of making hot-pressed nuts at a single operation, by severing a blank from a bar of heated metal, compressing it into shape, and punching a hole or eye through it, while under compression, and delivering the finished nut from the machine.

Sixth, Arranging the compressing dies, in relation to the punch, and regulating their relative motion, in such manner, substantially, as described, that any excess of iron in the blank shall be forced into the path of the punch in the compressing-dies, thus securing the compression of the nut without risk or damage to the machine.

RAILROAD CAR SPRINGS—The Railroad Car Spring Company, of Philadelphia, Pa., (assignee through mesne assignment of Henry M. Paine,) of Worcester, Mass. Patented October 27, 1857: We are aware that layers of felt have been heretofore applied as bumper-springs to railway-cars, such a device being shown in the English Patent of W. W. Taylor, February, 1841, in that instance, however, the felt was simply confined to a plate by a yielding leather cover s cured by cords, without any regard to the given condensation of the felt so as to obtain a proper recoil.

We, therefore, do not claim broadly, the application of fibrous material in the manufacture of car-springs.

But we claim as a new manufacture a railroad car-spring consisting of a body of felt or other fibrous material condensed to a given density between two rigid plates, and prevented from expanding beyond that density by a bolt or bolts, substantially as set forth.

DESIGNS.

HOT-AIR FURNACE—Hiram Bissell, of Hartford, Conn.

GAS BURNERS—Hiram B. Musgrave, of Cincinnati, Ohio.

CARPETS—Elimer J. Ney, of Lowell, Mass., (assignor to the Lowell Manufacturing Company.)

CARPETS—Elfmir J. Ney, of Lowell, Mass., (assignor to the Lowell Manufacturing Company.)

ADDITIONAL IMPROVEMENT.

MACHINE FOR TRIMMING THE EDGES OF PAPER-HANGINGS—John Waugh, of Elmira, N. Y. Patented October 5, 1858: I claim the framed-ways, W, X, moving in a curvilineal path on a center at one angle of frame. The hand-lever, X, that operates on frame-way and the springs, b, b, which keep the frame in position, in combination for the purposes as substantially as set forth.

INVENTIONS EXAMINED at the Patent Office, and advice given as to the patentability of inventions, before the expense of an application is incurred. This service is carefully performed by Editors of this Journal, through their Branch Office at Washington, for the small fee of $5. A sketch and description of the invention only are wanted to enable them to make the examination. Address MUNN & COMPANY,
No. 37 Park-row, New York.

American Helping England.

The British war-steamer *Curacoa*, recently run fast aground in the Bay of Smyrna, with Lord Stratford De Radcliffe and family on board. Russian steamers and Turkish boats were employed for days tugging and hauling, but could not start her, and so gave up the job. The American war-ship *Macedonian*, on going out of the harbor, on its way to Beyrout, came alongside, and its commander, Captain Levy, sent a boat alongside and tendered the services of his ship. It was joyfully accepted, and confidence was at once felt that the American "wouldn't give it up so," and so they stuck to it until the *Curacoa* was floated off. Three rousing cheers were given by the British tars for the stars and stripes, and the captain came on board, thanked Captain Levy personally, and said, "You have this day, sir, accomplished a work that will never be forgotten by Englishmen or England."

Sawdust Timber.

A new process has lately been brought before the public in Paris for reforming timber out of common sawdust, a substance which is held to be fit only for fuel or softening the floors of those ground and lofty tumbling establishments called *circusses*, to say nothing of dyspeptic bread composed of its indigestible fibers. The process for effecting the result stated consists in submitting the sawdust to a high heat and severe pressure in a press. It is said to be capable of being thus formed into any shape according to the mold used, and to present a brilliant hard surface, very beautiful in appearance.

CORRECTION.—In last week's issue of the SCIENTIFIC AMERICAN we gave a wrong address in connection with McKenzie's wrench and screw-driver. The proper one is James McKenzie, Green Island P. O., opposite Troy, N. Y.

New Inventions.

New Smut Machine.

This invention consists in the employment or use of a series of rotating and stationary conical scourers, placed within a proper case, the rotating scourers being placed on a hollow shaft, and the whole constructed and arranged relatively with each other and with a fan, as we shall describe, whereby the grain will be thoroughly cleansed from smut, dust, and like impurities, in a very expeditious manner.

Our engraving shows a vertical section of the machine, A being a framing of rectangular form, and sufficiently strong to support the working parts of the machine. This framing may be formed of a rectangular bed-piece, *a*, and four uprights, *b*, one at each corner, the uprights being connected at their upper ends by cross-ties, *c*.

B is an inverted conical metal dish, which forms the lower end of the machine, and is fitted in the bed-piece, *a*. This dish has an opening, *d*, at its lower end, and a step, *e*, is suspended to the lower end of dish, B, by curved bars, *f*, the step being a screw, *g*, fitted in a socket, *h*. To the upper edge of dish B, a metal rim, C, is attached. This rim has curved sides, and it is supported by upright lugs or ears, *i*, which are cast with it. The rim, C, is so curved as to leave a small space, *j*, between its lower end and the upper end of B. To the upper end of the rim, C, an inverted conical dish or plate, D, is attached. This dish or plate may be nearly if not quite parallel with the dish, B, and the dish, B, rim, C, and dish or plate, D, may all be connected by the same bolts, *k*. To the upper edge of this dish or plate, D, a rim, C′, is attached, and a dish or plate, D′, is attached to C. A rim, C″, is also attached to dish or plate, D′, and a dish or plate, D″, is attached to rim C″.

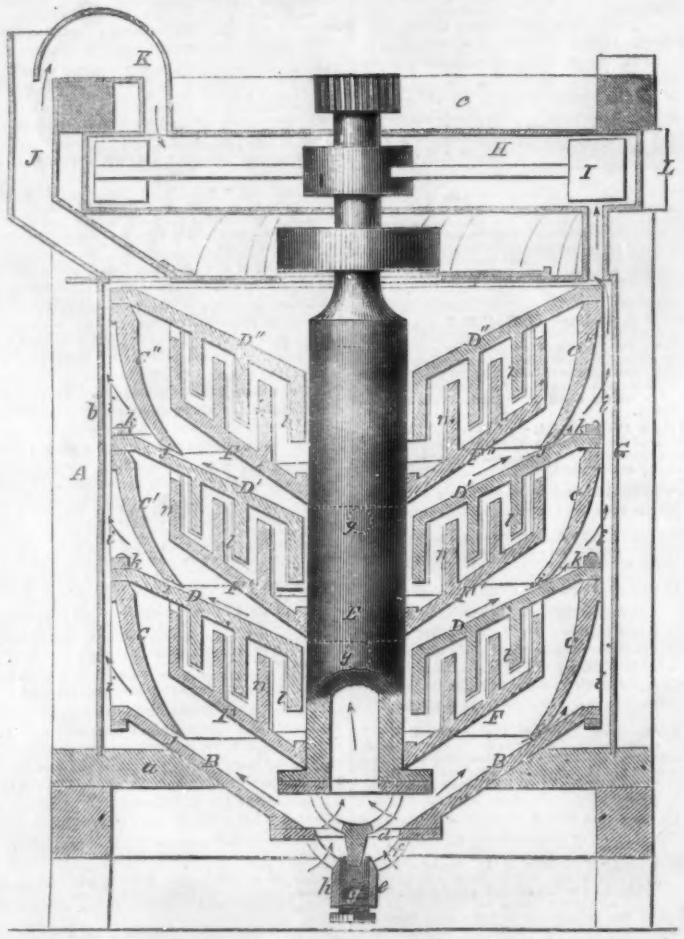
On the under side of each dish or plate, D D′ D″, a series of pendant and annular scouring ledges, *l*, are formed. Three ledges are shown in the engraving, but more may be used if desired. These ledges may be formed of concentric projections, having teeth cast with them, the teeth projecting down a short distance below the ledges, *l*, and projecting outward from their face sides.

E is a hollow metal shaft, which is placed vertically and centrally within the rims, C, and plates, D, and has its lower end stepped in the screen, *g*. The shaft has a series of inverted conical plates, F F′ F″, attached. These plates are each provided with three annular upright and concentric scouring ledges, *n*, which are constructed precisely similar to the ledges, *l*, of the plates, D D′ D″. The ledges, *n*, of the plates, F, fit between the ledges, *l*, of the plates, D, the teeth of the respective ledges being opposite each other.

The rims, C, and plates, D D′ D″ and F F′ F″ (any proper number being used), are encompassed by a cylindrical case, G, the upper end of which communicates by passages or tubes with a fan box, H. In the shaft, E, holes, *g*, are made, just below the plates, F. I is a fan placed on the upper end of the shaft, E, and within the box, H and J, is a spout, which passes through the top of the case, G, a curved spout, K, from the fan box, H, communicating with spout J. L is the eduction spout of the fan box, H. There is a driving pulley on shaft, E.

The operation is as follows:—The wheat to be cleaned (designated by arrows) passes down the spout, J, into the case, G, and falls on the upper part of the top dish or plate, D″, the wheat being subjected to a suction blast in passing down said spout, the blast entering spout K, as indicated by arrows. This blast, which is produced by fan I, takes all the loose smut and dirt from the grain before it enters the machine. The grain passes down the dish, D″, and through an opening, between the lower end of the dish and shaft, E, and falls on the plate, F″, and the grain, owing to the centrifugal force generated by the rotation of the plate, F″, is forced under and over the scouring ledges, *l n*, which form a sinuous scouring surface, the teeth serving as corrugations. The wheat passes off of plate F″, and falls on the dish or plate, D′, and in passing down this plate is subjected to a suction blast, which passes through the holes, *g*, in the shaft, E; the smut and dirt that was loosened as the grain passed through the scouring passage being drawn through the space, *j*, and up between the other sides of the rims, C C′ C″, and the case, G, and through the passages, *p*, into the box, H, the smut and dirt being ejected from the fan box through L. The wheat

LESTER'S SMUT MACHINE.



passes successively through the several sinuous scouring passages in the same way as it passed the one described, and is subjected to a blast as it passes down each plane, D D′ D″, the wheat being discharged through the opening, *d*. The shaft, E, and plates, F, may be raised at any time by adjusting nut *g*.

This machine performs its work very efficiently, and in a rapid manner. The loose smut and dirt being removed previous to the scouring, and the grain being subjected to a continuous blast during the whole of its passage through the machine, the smut and dirt cannot be ground into the eye of the grain, as is the case, to a greater or less extent, with many other machines.

It is the invention of J. N. Lester, of Oswego, N. Y., who may be addressed for further information. A patent was granted August 17, 1858.

Cotton's Preserve Can.

The preserve can is intended to keep any of the usual edibles which are kept from one season to another, and this it will do securely, not allowing any air to enter from the external atmosphere, when once closed up. The can, itself, A, is made in the usual way, and of any size required, but the top is bent downwards at an angle, *b*, so as to form a recess into which the wax or cement can be poured to secure the top, B, in its place and render the can air-tight. When steam is generated in the can, there is sufficient pressure to move the top and prevent the wax or cement from hardening in the proper manner; this is prevented in this invention by the addition of small fastenings, C, that can be turned on to the top to hold it down while the cement is becoming set and the contents of the jar are cooling. These fasteners are simply pieces of wire bent at right angles, and one branch passes through a small socket, *a*, attached to the can, A, the lower end is then bent up and it forms a very good device for holding on the cover.

It is the invention of P. H. Cotton, of Demopolis, Alabama, and it was patented Dec. 21st, 1859. Any further information can be obtained by addressing Messrs. Braswell & Cotton, of the same place.

Messrs. Gomez & Mills, of this city, have petitioned Congress, through the Hon. W. H. Seward, to witness a trial of their fuse, and if it answers then as it has done on every other occasion, they pray that the government will buy the right for the benefit of the army and navy. It was referred to the committee on military affairs.

Phelps' Water Cooler.

That wonderful agent in the operations of nature, electricity, which man has turned to account in so many ways, has, by this inventor, A. H. Phelps, of Trenton, Mich., been made to be of service in what seems to be a most unlikely field, namely that of cooling water. By the aid of our illustrations and description, the operation of the device will be understood.

Fig. 1

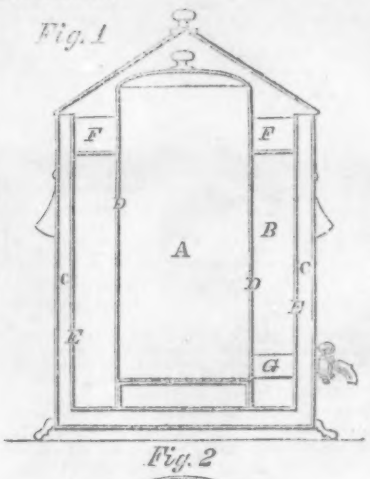


Fig. 2

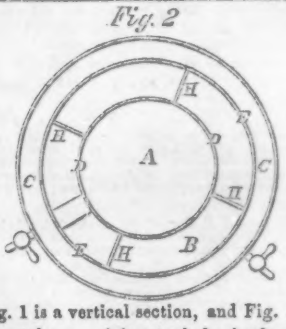


Fig. 1 is a vertical section, and Fig. 2 is a horizontal one. A is a tank for fresh water, and B is a space for ice and salt, the space, C, being filled with pulverized charcoal. The partition wall, D, is formed of sheet zinc, and the wall, E, of sheet copper. F is the refrigerator, and G is an air chamber around the fresh water faucet. There is also another faucet to remove the water produced by the melting of the ice. H are braces to hold the tank, A, in place. The inventor describes the operation in the following manner. When ice and salt are placed in B, a current of electricity is generated between the two walls, D, and E, the one being of copper and the other zinc. This current will preserve the ice and salt for many hours, and the water in A will be rapidly cooled, so that it can be refilled many times a day. Ice cream can also be made in this cooler with very little labor, by drawing the water from A and placing cream therein which is cut off the side as it freezes.

The advantages which Mr. Phelps says his cooler possesses over others are, that any quality of ice can be used and every farmer who has a swamp on his farm, where he can get two inches of ice, can have his ice-house and all the luxuries which ice affords in summer. And it saves ice, not requiring anything like the quantity usually employed in other coolers. We think with the inventor that this is a very excellent cooler, but he is wrong in giving electricity the praise; it is the charcoal in the hollow wall, C, that prevents the ice from melting, and not any current that is passing through it.

Any one can obtain further information by addressing the inventor, as above.

The Commissioner's Report.

We have great pleasure in presenting the annual report of the Commissioner of Patents which we doubt not will be read with interest by all our readers. It is a well-written document and does credit to its author. We shall give some attention, in future, to its suggestions and recommendations. The Commissioner pays a deserved tribute of praise to acting Chief-examiners, Messrs. Cowes, Jenks and Antisell. These faithful officers deserve to be promoted to the full enjoyment of the honors and emoluments of the position which they now fill.

Scientific American.

NEW YORK, FEBRUARY 26, 1858.

A New York Observatory.

Great hopes were at one period entertained that the Dudley Observatory, at Albany, would become the most distinguished on our continent, and an ornament to the great State of New York, but the quarrels between its superintendent astronomer and trustees have destroyed all such anticipations for the present. This may account for the incipient measures which have lately been taken for the establishment of such an institution in this city, hence Professor Mitchel's recent able lectures on astronomy as a movement towards securing such a result. This is not the first movement of the kind that has been made by the merchants of this commercial metropolis. Several years ago, an association was formed with the object in view of erecting an Observatory on that most conspicuous and eligible position, Brooklyn Hights; but, although there were quite a number of very respectable persons connected with it, no practical results followed. We are afraid that the same fate will attend the present impulses in this city to erect an Observatory, still we hope it may be otherwise.

It is generally admitted that an Astronomical Observatory is of more importance to a maritime city than any other, and yet New York, which is the greatest seaport on our continent, is surpassed in spirit by Cambridge, Mass.; Cincinnati, Ohio; Albany, N. Y.; Ann Harbor, Mich., and Washington, D. C., all of which cities have Observatories. This is a stigma upon the most populous commercial city in America, and the sooner it is wiped out the better will it be for its credit. That a city with a population of six hundred thousand inhabitants, an immense aggregated capital, and a shipping interest only second to one other city in the world, should have allowed itself to be surpassed in scientific enterprise by some exceedingly small cities is almost incredible, but it is nevertheless true. Astronomy has done great things for navigation, yet New York which depends so much upon the commerce of the seas has done nothing for astronomy.

In regard to the movements already made for the erection of an Observatory in this city, some complications have sprung up which appear detrimental to the successful consummation of this enterprise. An eligible site has already been selected in the Central Park for the erection of the building; but the Chamber of Commerce has appointed a committee to get subscriptions, and endeavor to obtain a grant of land for another Observatory in the Battery Park. It is true that this latter one is merely contemplated for meteorological purposes and testing nautical instruments, but at the same time it must divert concentrated and unanimous effort from completing a first-class institution in the Central Park or any other situation in New York. Between these two movements the whole Observatory enterprise may be torn to shreds, hence we raise a warning voice against any cross or jarring actions that would tend to prevent the consummation of such a desirable project. It is our opinion that a unanimous effort should be made to erect and endow one first-rate Observatory, and not two, each below mediocrity. Meteorological observations and the testing of chronometers can be carried on in connection with astronomical observations in one place, as at Greenwich, England, more effectually and economically than in two establishments.

The friends of this movement should all meet, and decide at once upon a site for the structure, and wherever it may be selected, let parties and conflictions cease from that moment. Let all unite the energies of their minds, and contribute a moderate share of their substance, and the enterprise cannot fail to prosper. It is due to the credit of the city, and the merchants of New York, that the movements now making to secure the erection of such an institution be not mere *mock heroics*, but the fervent intentions of men who are determined to secure complete success.

Concrete Buildings and Roofing.

Our attention has been directed to an article on this subject in the Houston (Texas) *Telegraph*, by Mr. Thomas Affleck, of Washington, Miss. (the distinguished horticulturist), who informs us that this is a very important question to the growing State of Texas, and our opinion is solicited in regard to the best manner of building such houses, and the best kind of composition roofing which may be employed.

Concrete is a composition of mortar and gravel, or small stones, cemented into one mass. Good houses may be constructed of such materials, if sufficient time is allowed to elapse for the walls to become so dry before the floors and partitions are put in, that they may not afterwards crack. The cheapest and best method of erecting such walls is to put them up in sections—something like blocks—by laying the concrete in cradles, which are simply studs, set up at certain distances apart in the walls, to fulfil the office of guides or molds.

During severe rain storms, such walls are liable to be penetrated with moisture, and thus cause great dampness in the interior. To prevent this, they require to be coated on the outside with some impervious substance. A good composition is that of a coating of common lime whitewash, to which has been added three ounces of dissolved sulphate of iron (copperas) to the gallon. It should be put on cream thick with a common brush; when dry, it is very hard and adhesive, and of a pleasing cream color. This is only a preparative basis, as it is not a perfect water protective. On the top of this there must be applied a coat of linseed oil, which has been boiled two hours with four ounces of the flowers of sulphur (added cautiously) to the gallon. When this dries, the walls will be waterproof.

Composite roofing may be made in the same manner as concrete walls; but we are of the opinion that thin slabs composed of sand and lime (to which has been added a little fibrine or gelatine) molded and dried in the sun, would suit a better purpose. They should be laid down on a layer of mortar, and joined at the seams with common putty.

Hydraulic cement, which has been used in some instances for roofing, is not suited for this purpose, as it is liable to crack and disintegrate when it becomes very dry. Of course such a roof as that described requires to be finished with the sulphur oil varnish in the same manner as the concrete walls. As the days are very warm and the nights cool, in Texas, composition roofs which have pitch or resin as their basis, are not adapted to the climate; and almost every kind of composition roof is liable to crack, owing to the great amount of variable contraction and expansion. The material of which roofs should be composed for such a climate, ought to possess such an amount of cohesive strength as not to crack by the expansion and contraction to which it is subjected. The composition which we have described will be found very strong, as the gelatine (which may be coarse glue or bullock's blood) has great adhesive qualities.

As concrete walls are generally thick, they require a considerable period of time to elapse before they are finally plastered inside, in order to prevent dampness in the interior of the house.

If linseed oil is difficult to obtain for making the varnish described, any other vegetable oil, such as that derived from cotton seed, will answer nearly as well. This oil sulphur varnish is somewhat elastic, is unaffected with the weather, and possesses properties similar to those of vulcanized india rubber. Such roofing, we believe, is also quite applicable to strong frame houses, which have roofs of a very slight pitch. Houses constructed as here described, we doubt not, will be durable and comfortable, and may be erected at a moderate expense.

Fuel Saver for Locomotives.

The question before the Patent Office with regard to the origin of the diaphragm which has been introduced quite extensively in the smoke-boxes, has been decided by the issue of a patent, on the 1st inst., to Mr. Wm. S. Hudson, the superintendent of the locomotive works at Paterson, N. J. This diaphragm stands crosswise between the boiler and the smoke-pipe, and its effect appears to be to retard the current through the upper part of the smoke-box, and compel the gases to dive down and pass beneath it, when the engine is in motion, while the apertures are simply sufficient for the passage of the whole draught while the engine is standing still on account of the slower combustion in that condition. By this means the hottest gases are retained longest in contact with the boiler, and it is affirmed to effect a very sensible saving in fuel. We understand that the inventor does not intend proceeding against any of the railroad companies who have already introduced the invention, but is content to secure a monopoly of the construction of locomotives involving this feature in the future.

New Seeds for Farmers.

No class of men are more liable to be imposed upon than our plain, honest farmers. They seem to be made the subjects of special favor almost every season by all sorts of flaming advertisements about some wonderful seed, which, if sowed or planted, will be sure to double their crops, without half as much labor bestowed upon them, or expense for fertilizers, as other seeds. Somehow, it always happens that these seeds are sold at a most exorbitant price, and in many cases the cost for them is greater than that of the entire crops afterwards obtained. The great Rohan potatoes, which sold for a dollar a-piece for seed, were to multiply so fast and grow so large, that a bushel was to be hoed out from each hill. One season, however, sufficed to extinguish their character and the species also. Several other seed speculations have adorned the puffing annals of our country, and the pockets of those who originated them. We find that an attempt is being made to create another fever of this character at present out of a new grass called the *honey-blade*. The seed of this plant has been selling, according to the Ohio *Cultivator*, for no less than nine dollars per bushel in some places, while it is said to be nothing but German-millet under a new name. We know nothing of the merits of the new-fangled grass, but our farmers will do well to look out sharp before they suffer themselves to invest very deeply in this sweet-sounding seed.

Tunnels through Deserts.

A French engineer seriously proposes a scheme for turning the sands of the great African Desert into solid arched blocks for the construction of a tunnel extending the whole length of the sandy waste. The method proposed is to mold the sand by moisture into blocks of the proper shape, then fuse them by the heat of the sun's concentrated rays by means of a huge Archimedean burning mirror. The object of this tunnel is stated to be the protection of travelers from the desert simoons and sand storms, and to make Algeria the entrepot of the commerce of the Mediterranean with Africa. The scheme is a splendid one, but its foundation is laid in the sand, and we are warned that this is a foolish way of building.

Rotary-Engine Canal Boat.

A new steamboat for the navigation of the Erie Canal, was launched at Lupton's shipyard, Greenpoint, on the 8th inst. She was fully completed, and had steam on when she was launched, and soon after touching the water made a trip down the river. She is 98½ feet long, 17½ feet beam, 7 feet hold, and 6½ feet between decks. Another boat of similar size will soon be launched from Sneedon's ship-yard of the same place. They are owned by Barstow, Pope & Co., and furnished with Barrow's double-acting rotary engines, and have screw-propellers.

Pressure on Slide Valves.

Messrs. Editors—In your issue of the 12th inst., my attention was attracted to the communication of Mr. Cameron, in which is stated his information of the results of experiments made at Paterson, N. J., which show that the pressure of a slide-valve is equal only to the sum of the area of the ports multiplied by the pressure in pounds per square inch, with an allowance for pressure on opposite side, &c.

As this has been, and still is, a mooted question, any experiment tending to throw light upon it would, doubtless, if published, prove acceptable and interesting to many of your readers. I would, therefore, in this connection, offer the result of an experiment made very recently by a friend of the writer of this, which goes far to establish the theory presented by you in your paper of January 15th.

The experiment alluded to, was made upon a locomotive engine having a 19-inch cylinder and 22 inches stroke, and provided with a variable exhaust, the nozzle of which, during the progress of the experiment, was reduced to three and a half square inches area, while working hard with one hundred pounds steam pressure. The following are the dimensions of the valve and ports:

Area of face of valve,	120	square inches,
" " steam-port,	15	" "
" " exhaust-port,	22½	" "

The slide-valve was subjected to an upward strain obtained by means of a frictionless piston of seventy square inches area, being coupled to the valve in such a manner, that during the entire throw of the valve, an uniformly perpendicular strain was maintained, (the pressure per square inch upon the valve and balancing-piston being equal,) yet there was not the slightest indication of leakage under the valve, even when the exhaust-nozzle was contracted to five and a half inches, and the area of the balancing-piston, viz., seventy inches, proves conclusively, that the pressure upon the valve is much greater than is due merely to the openings under the valve, and would seem to afford good reasons for the deduction that the slide-valve, when well-fitted to its seat, is subject to a downward pressure equal to the sum of the area of its face, multiplied by the pressure in pounds per square inch, making allowance for so much of the face of valve as is exposed to opposite pressure.

J. E. Wootten.

Philadelphia, Feb., 1859.

[The experiments detailed by our correspondent confirm the opinion given in connection with Mr. Cameron's letter, as published in No. 23 of the present volume of the Scientific American.—Ed.

One Hundred and Fifty Patents have issued since January 1st to inventors whose papers were prepared at the American and European Patent Agency Offices of Munn & Co. This extraordinary success fully confirms the opinion expressed by Judge Mason, Ex-Commissioner of Patents, who, in a letter, states that while he was at the head of the Patent Office, more than one-fourth of all the business passed through their hands, and that he had no doubt the public confidence thus indicated was fully deserved. Inventors can rest assured that no other Agency in the United States has had an equal amount of experience in the examination of inventions, preparation of drawings, specifications, and attending to all the business necessary to secure the rights of inventors. Inventors who seriously intend to apply for Letters Patent, and consider their inventions worth anything, should be extremely cautious to have their papers prepared by experienced attorneys, and if they wish to consult with Munn & Co., they can do so in confidence, by sending to them sketches and descriptions for their examination. Circulars showing how to obtain Letters Patent sent free.

OUR MANUFACTURES.

(Illustrated.)

THE NEW YORK WIRE RAILING COMPANY'S MANUFACTORY.

Our second article on this series of subjects relates to a comparatively new American art, and one of very great importance. Although it is only a few years old, it has already become an extensive and permanent business and owing to its *utile dulci* character, it will go on assuming more gigantic proportions as it becomes better known to the community. It embraces very original manufactures o iron composite-work, such as railings, fences, household furniture, and also iron wire-work of varied design and application.

It was known long ago that wrought iron was stronger and more flexible than any material employed in the arts, and that it was indestructible by the elements of the atmosphere, when protected with paint. But to forge it out of rods and bars into a great variety of forms, pleasing to the eye as well as useful and durable in character, was out of the

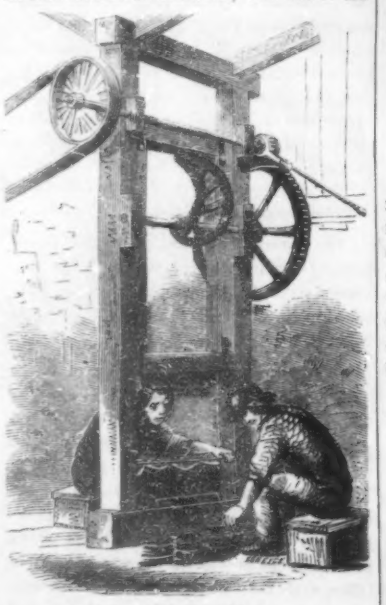


FIG. II.—DROP PRESS.

question, owing to the great expense incurred for hand labor. The utility and adaptability of the metal for innumerable new purposes was acknowledged, but the genius of the inventor was required to reduce it to practical purposes. This was at last effected; genius met all the difficulties which had been presented, and overcame them; and the result is the manufactory and manufactures we are about to describe.

FORGING AND MOLDING.

The New York Wire Railing Company, Messrs. Hutchinson & Wickersham, have their warerooms at No. 312 Broadway, this city, where all their various beautiful manufactures are displayed, sales made, and orders received; but our object is, at present, to illustrate and describe their manufactory, and the machinery and operations carried on therein. The building is a commodious five-story brick structure situated in Lewis street, between Nos. 53 and 59, and covers a considerable extent of ground. The entrance into it is through a wide porch, which extends into a covered court, and on the right hand is the office. Passing into the establishment, we obtain a sight of the operations carried on as represented by the first illustration, Fig. 1, which is a view of the principal floor. To the left the blacksmiths are seen at their several forges, of which there are seven. In the center is the cupola furnace for smelting the pig

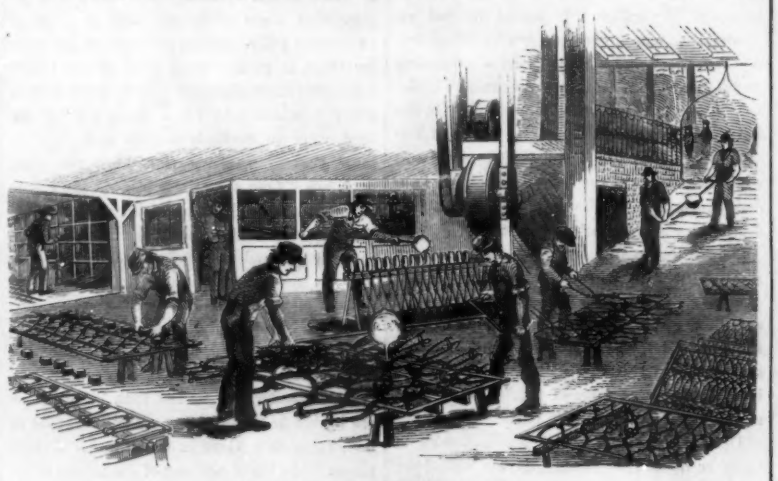


FIG. III.— COMPOSITE IRON WORK.

metal, and beside it is the floor for green-sand-molding, with the operatives engaged in their several vocations. Columns, capitals, posts, and various ornamental iron-work are cast on this floor. In the distance an operative is shown molding pickets on the top of a panel of railing, an operation which is sometimes, but not constantly executed on this floor.

In the southwest corner is a huge drop-press, more clearly represented by Fig. 2. Its office is to bend and crimp into various patterns, very strong wrought iron round rods for composite work. The drop of the press is a very heavy weight, which is raised in its upright frame by a revolving cam, then allowed to fall from a certain elevation upon its bed below, in which is secured the strong iron rods that are bent and curved into the form required, by the die from which they receive the blow of the drop. We saw a grating composed of iron rods, each one inch in diameter which had been crimped in this press and afterwards woven, and we must say that it was strong enough to form a dungeon-door for a Titan.

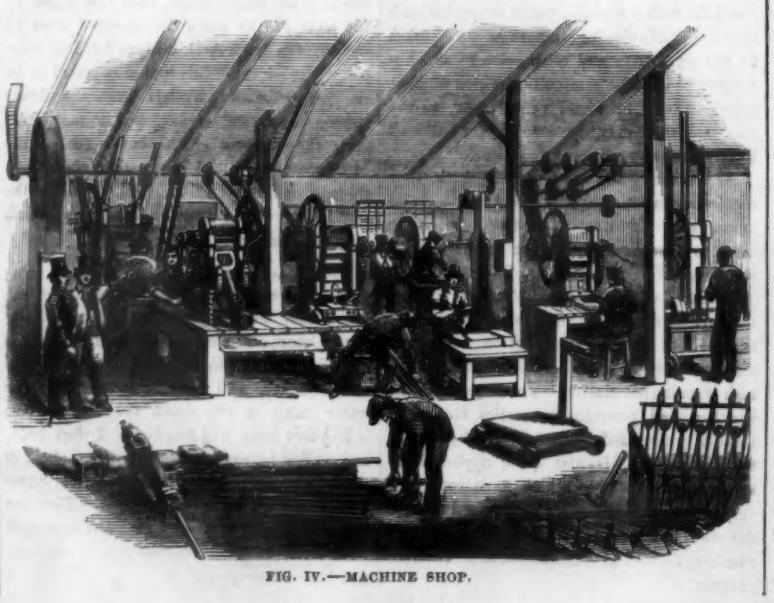


FIG. IV.—MACHINE SHOP.

A very great variety of this peculiar kind of iron-work is manufactured in this establishment. Its name is expressive of its character, as it consists of a combination of wrought and cast iron. The frame of the manufacture (if it is a railing) is of round, wrought iron rod, cut first into proper lengths, then bent or crimped into different shapes to produce the patterns required. After this, they are fitted together, in an apartment up stairs, in the precise order which they are to assume when completed. These wrought iron rods, or framing of the railing, are next tied together by casting iron ornamental chills around those parts where two or more of them meet, thus permanently uniting them all.

In Fig. 3 we have a view of the basement or underground apartment, where the casting of the composite work is chiefly executed. One panel of a railing is represented as laid in a horizontal frame with a series of small iron molds fastened at intervals along its middle. Each mold grasps one or more of the bent rods of the panel where they meet together, and the molten cast iron is poured out of a ladle into each alternately, and forms the series of chilled iron ties which unite the

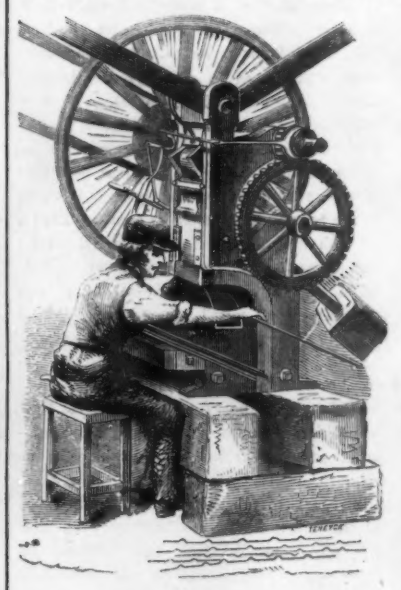


FIG. V.—CRIMPING.

whole into one piece. Each mold resembles a large pair of tongs with deep jaws; these latter grasp the rods, while their shanks are made fast by a ring, and thus they are held in position while the casting is being conducted. One panel of a railing is represented as having its middle ties formed of rosettes, the molds being of this pattern; another panel is represented in a state of preparation for the casting of the chills; while a third is set upright to have its pickets cast on the top of the iron rods. In panels which have their rods passing through flat rails at the top, a rosette or tie is generally cast below the rail under the picket, which tie thus fastens the rod very firmly above and below, and closes every crevice to prevent the entrance of moisture. The cast iron chills form the ornamental parts, and unite the rails and rods permanently, and make each section or panel, one connected piece of metal. Such composite iron work associates beauty, strength and durability at a comparatively low cost.

When a series of ties or pickets are cast on a section of such railing, the molds can be taken off immediately, and the cast section removed, to make room for another. The cast metal sets rapidly in the molds, and becomes very hard, while its high temperature when first poured in, partly fuses the wrought iron, and thus the two metals are united as one.

It must be remembered that all the rods which are crimped for the composite work are

submitted cold to the action of the presses, and do not undergo the tedious and expensive process of heating. The rails, rods, and flat band metal, together with the various sorts of wires used in this establishment, are made to order for the special purposes they are intended to subserve. There are no less than one hundred and forty varieties or orders of iron rod, rail, wire, and other deseriptions of iron required. When received and weighed, the metal is passed down through a shute into the basement, and stowed away in separate racks, according to its quality and order, until it is required for use.

The engine which drives the blowers for the furnace fires, and machines is also kept in the basement. It is provided with a tubular boiler, which supplies the moving force and heats the entire building. There is also a hoisting apparatus from the lower floor to the top of the manufactory, by which the articles are elevated and lowered to the several floors by the engine, according as they are required; so that all the hoisting and other operations are conducted with a due regard to the economy of labor, whereby the company is enabled to produce such products at reduced prices. Manufactured articles for shipment, or to be delivered in any store or place in the city, can be lowered upon carts by the engine, and at once carried to their destination.

We will now pass again to the floor above, represented by Fig. 4, where most of the machines are placed. It is on the same level with the large apartment (Fig. 1), but situated on the opposite side. The rods, bars, and rails are here received from the stowage room in the basement, and cut, punched, drilled, and crimped ready to be set up for composite work. There are three punching machines ot various sizes, two crimpers, several lathes, one drill, and one planer. The punches and crimpers are Dick's presses, adapted for cutting, and other purposes, according to the tools which are set in them. The iron rods or rails are cut into the requisite lengths for railing, &c., in a punching machine; then the rods are bent or crimped in a suitable die by another machine—represented by Fig. 5. The iron rod which we saw crimped in this machine was three-eighths of an inch thick; and it is shown as putting several crimps in at once—the die and the power of the press being adequate for this. Rods varying from three-sixteenths to half an inch thick are crimped in this press.

The crimps are graceful curves, which enable these rods to be blended together in such manner as to assume a graceful combination of parts, and also to become either interlaced or closely tied together by the chills of cast iron, as has already been described in molding the pickets and rosettes of composite work. The crimping of these rods, and the uniting of them by cast chills or tie rails, ensures great strength and firmness, as well as elegance, in the manufactures, an endless variety of which can be produced, according to the form of the dies used. All the work executed in this apartment is in preparation for the fitting-up operation.

The next floor above the one described, is the fitting-up room. The crimped and punched rods and rails for composite work are here fitted into their appropriate positions, as represented in Fig. 6. Some of the railing is made with thin wrought iron T-rails as cross-ties for the top and bottom of the bent and crimped rods. These rails have a series of holes punched in them, through which round rods pass vertically, and the top ones are left projecting for cast iron pickets to be molded on them. Some composite railing is made without the cross tie bars, the crimped rods being so blended together that they are tied by chills perfectly firm and strong without being riveted to T-rails. As the variety of composite work is very great, all the different patterns of work are carefully made up in this room, and accurately arranged to fit in their separate sections for the casting of the ornamental chills in the basement. Great care is

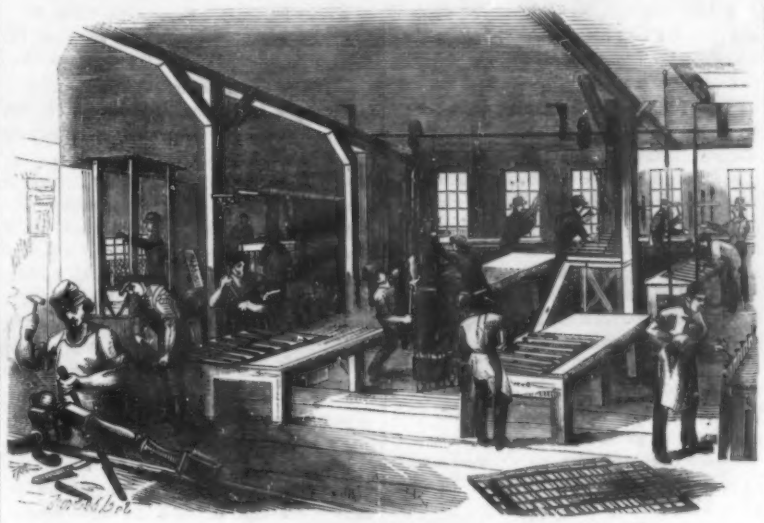


FIG. VI.—FITTING-UP.

observed to have all the combinations perfectly adjusted, to ensure the best results in regard to every desirable quality in the work when finished.

Besides fitting the articles together, to prepare them for casting the ornamented ties of the composite styles, much of the work is here trimmed and completed, after undergoing the molding operations, to make it ready for painting, gilding, and varnishing. The articles undergo a thorough examination to detect flaws, and remedy them, if any are found, so that all the work may be as perfect and complete as possible when it is finished.

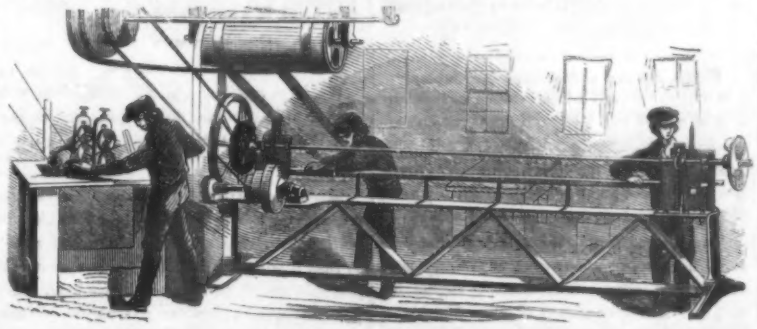


FIG. VII.—FENCE-MAKING.

We will now pass to the floor above (fourth story), where the weaving of the strong wire-work and the formation of fencing for farms, is executed. Fig. 7 represents the machine for making the wire fence. The wire designed for this purpose is one-fourth of an inch in diameter (not annealed), and is cut in lengths of twelve feet, which may be considered as rails, as there are five of them, arranged one above the other, in a fence of about six feet in hight. Each length or rail has a loop bent on both ends in this machine, whereby it is to be secured in posts, and tied to its connecting rail. The cut wire—one length at once—is laid on a round pin at each end. A revolving cam plate at both extremities of the machine now brings down a jaw, which bends the end of the rod downward alongside of the pin; when this is done, the same cam pushes in a horizontal bar, and doubles the wire around the pin; then another jaw is forced upward, and presses the loop so formed perfectly close, and the rail is completed ready for fencing. The operations at both ends of the machine are similar, a loop being formed at each end of the wire during every revolution of the revolving cam plate. This machine is under perfect control, and can be stopped at any portion of its stroke, and can loop no less than two miles of fencing in one day. Wire fences are well adapted for fields where stone and timber are scarce and dear. The first fences of this character made in our country were of annealed wire, which is easily bent in putting up; it is this very quality that injures it, as regards firmness and durability. Annealed wire takes the set so easily, and is so liable to stretch, that animals soon render it shapeless when put up in a fence. Farm fences should be made of bright charcoal wire—the kind used in this establishment. It is more elastic, does not stretch, and is stronger than annealed wire.

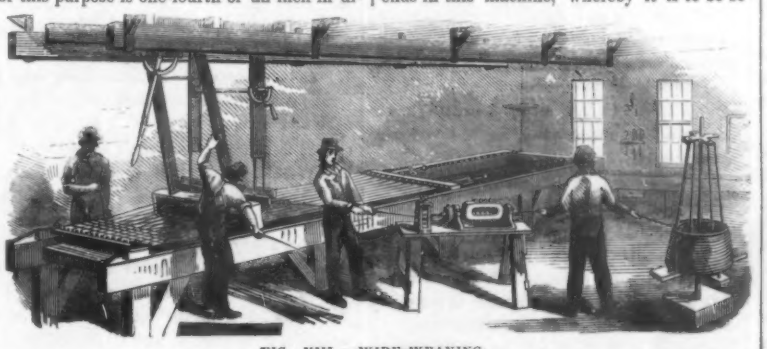


FIG. VIII.—WIRE-WEAVING.

There is also what is called the "corrugated flat iron fence" made in this manufactory. Regarding it, the editor of the *Courier and Enquirer* (this city) speaks in the highest terms. He put some of it up five years ago at Tarrytown, N. Y., and after exposure to the elements, during summer's heat and winter's cold, since that time, it has not varied one inch from its original position. It is as perfect now as when put up, and not an hours' labor has been expended on it since. He thinks it has no rival for the western prairies.

In the room where this machine is in operation, several kinds of wire-work articles are also constructed. The small machine in Fig. 7 represents a rotary crimper for wire; it consists of a pair of fluted rolls, between which five pieces of wire are placed at once, and are crimped rapidly, for weaving into screens and other wire netting.

On the other side of the floor from that of the large machine described, is the loom for weaving wire into webs for screens, netting, &c. The wire used for this purpose must be perfectly straight for the warp. It is taken off coils, and straightened in the small machine represented in Fig. 8. This machine has a revolving flyer, through the center of which the wire to be straightened is passed, and then inserted between the two small grooved rollers. As these rollers and the flyer revolve, the wire is wound off the coil, all the kinks in it taken out, and the whole rendered perfectly straight. The straight wire is cut into certain lengths, and forms the warp of the loom as they are laid along in a straight row, like so many threads, and passed through the iron heddles and slay of the loom, and then secured to the breast-beam. The wire for the weft is straightened in the small machine shown in Fig. 8, and is inserted in the shed of the wires in the loom, passing over and under each alternate wire of the warp; the slay then beats it up into place to form the netting or strong wire-cloth. The wire weft is put in by hand in the same manner that hair-cloth used to be woven, each hair being the exact breadth of the cloth, and fed in singly. This loom, of course, is different from that employed to weave hair-cloth, its special purpose and construction being dissimilar.

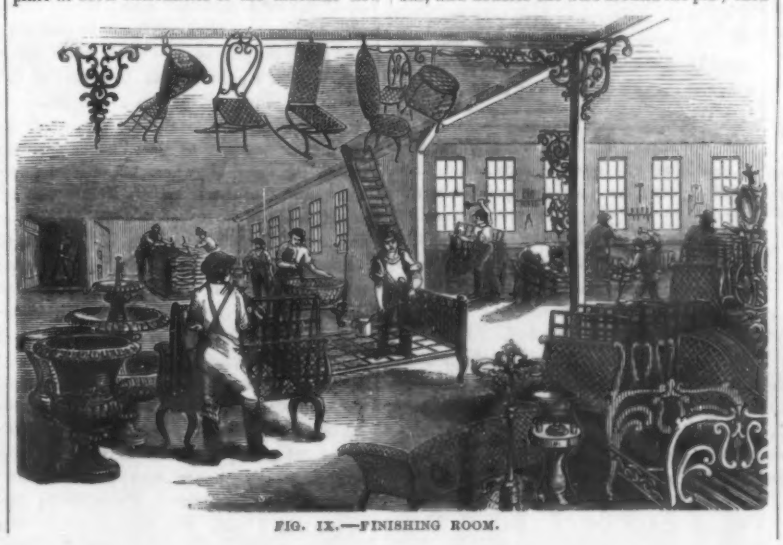


FIG. IX.—FINISHING ROOM.

IRON FURNITURE.

We will now proceed to describe the fourth apartment, where all the articles are finished, as illustrated by Fig. 9. The composite and other work requiring trimming and exact fitting together—such as panels of railing united to posts, gates, minute figured borders, &c.—are completed, and made ready for sale and use on this floor. It will be observed in the illustration that several kinds of bedsteads are represented—articles of manufacture regarding which we have not yet said anything. A very great number of these are manufactured in this establishment; in pattern, size, and quality, they form a special subject of astonishment. Some are made of composite iron work; others a combination of composite and wire-work; while others are composed entirely of wrought iron. Some of the patterns are very plain, others are elaborate and ornamental; but all

are neat, airy, and compact, and have a light and graceful appearance. They are all made to fold up, so as to occupy a very small space when they are not required for use; and they are very cleanly, as they contain no cracks or crevices for those troublesome insects which infest and find breeding-places in all wooden furniture. Folding sofas or lounges, with wire-netting backs, also chairs upon the same principles of construction, are here manufactured. It is also in this department where all the articles are painted, gilded and varnished. Some are made to imitate rosewood, others mahogany and black-walnut; some are gilded in stripes and figures, while others are plain. All tastes and fancies are consulted in this respect, but the very plainest article has an attractive appearance. It is in this room where the best idea of the adaptable character of iron to so many purposes is obtained. Here we can witness and compare the variety of patterns in each class of work, and the very great variety of the classes themselves. It would extend the list of such manufactures to an undue length were we to give it in full, but the following summary will convey some idea of their extent:—There are composite iron-work of railings, gates, balconies, bedsteads, lounges, cradles, chairs, cemetery enclosures, &c., cast iron fronts of houses, lintels, caps, posts, fountains, &c.; wire-work screens for coals and metallic ores; bulwark netting for vessels, wire railing, fences, baskets, &c.

We have stated that the building consists of five stories; we have not illustrated one of the floors, because similar operations are carried on in it as in another apartment.

It is in place to state here that the New York Wire Railing Company conduct their operations under no less than fifteen patents; and we believe we cannot present more interesting information than to give the date of each, and state the nature of the improvement, accompanied with such remarks as are applicable to the subject.

The following five patents were granted to Henry Jenkins, and are assigned to the company:—First, Issued March 6, 1847. It embraces the wire-work for coal-screens and netting. The Patent Office Report of the foregoing year noticed this invention in very favorable language, and prophetically alluded to it as destined to become a very extended manufacture, which is now a fact. Second, This patent was granted on the same date as the one above; it is for the improved loom represented and described for weaving the strong wire netting. Third, Issued February 13, 1849, for iron railing, which is now so extensively used. A park of ten acres in Savannah, Ga., is enclosed with it, so is the Crystal Palace Park in this city, and various other parks in almost every city and town in our wide country. Fourth, Issued January 13, 1852, for the celebrated composite iron-work. Fifth, Granted for the iron railing of the same character as that which surrounds Carroll Park, in the city of Brooklyn.

The following seven patents were granted to J. B. Wickersham:—Sixth, Improved fence; July 1, 1851. Seventh, For the celebrated farm fence made of hard bright wire; March 9, 1852. About 400 tuns of this kind of fencing have been put up in various parts of the United States. Eighth, Design for metal bedsteads; December 23, 1856. Ninth, For the compact folding bedstead; June 2, 1857. Upwards of 10,000 iron bedsteads are now made annually in the city of New York alone. Tenth, Improved iron fence; September 16, 1556. Eleventh, Another improved fence; January 13, 1857. Twelfth, Hat-stand; June 7, 1857.

The three following patents were granted to P. M. Hutton, and assigned to the company:—Thirteenth, Design for cast iron bedsteads; May 21, 1851. Fourteenth, Issued September 2, 1851. Fifteenth, For iron cradles; October 26, 1852. It is very clear that this company is well protected in the manufacture of their original, useful, and beautiful productions; hence we have some explanation as to their rapid increase.

A short time ago, the University of Virginia was provided with iron furniture from this establishment. The steamships *Arago*, *Adriatic*, and others, are fitted with wire-netting bulwarks. Their iron railings have been put up in places too numerous for us to mention. Various parks and public buildings are enclosed with it, and there is but one opinion as to its beauty and durability. In our southern climates especially, where wooden fences are so subject to the attacks of insects and to rapid decay, they have found great favor, because they are indestructible either by insects, dry rot, or fire. There is, perhaps, not a cemetery in our country in which there are not quite a number of lots enclosed with it; and some of these have very appropriate devices for the place and purpose, combined with their general patterns. In short, this iron composite work and wire-work combinations, as produced in this manufactory of the New York Wire Railing Company, as we have before stated, has become a great business, but is yet destined, owing to its meritorious character, to become far more extensive.

The company has got up a very beautiful illustrated catalogue of the articles which they manufacture, and which may be obtained at their office in Broadway, or will be forwarded to any part of the United States on sending four three-cent postage stamps to their address, No. 312 Broadway, New York.

Gutta Percha and Submarine Cables.

We have received a letter from a superintendent of one of our telegraph lines, corroborating the statement of Mr. Bishop, on page 173, present volume of the Scientific American, in regard to the good qualities of gutta percha for covering submarine cables. He says:—"From several years' experience, I find that when the gutta percha wire is constantly submerged, the gutta percha remains almost intact, and nearly as pliable as when first made. I have seen cases where it has been partially exposed to the atmosphere, that the outside coating has cracked, but the inner one remained as perfect as when first used; hence I consider Mr. Norris (whose letter was published on page 170) to be laboring under erroneous impressions, and that he has condemned the only real practical insulator extant. I know that after gutta percha has been submerged for a considerable period of time, and then exposed to the atmosphere, it will become brittle and crack, as he describes, but it will not do so under water for a number of years at least.

The suggestion of employing a combined covering of gutta percha and hemp is very good, no doubt, but it calls for an unnecessary and extraordinary expense. When science and money shall have procured all the other portions of our ocean telegraph cable as perfect in their respective functions as gutta percha is for insulation, then there will be no difficulty in working a submerged wire across the Atlantic Ocean."

Mr. Norris, to whom reference has been made, may have good data for his conclusions, so far as his observations have been extended; but the above correspondent has had long practical experience in telegraphing, and his remarks, therefore, have great weight.

Coal Frauds.

A committee of the Common Council of Philadelphia, appointed to examine into frauds in selling coal, have reported in favor of using Martin's self-weighing cart, which was illustrated in a former volume of the Scientific American, as the best method of preventing them. A special committee of the New York Common Council, appointed to examine into the same subject, met in the City Library on the 9th inst., and examined into the merits of this cart also, and seemed to be very favorably impressed with its reliability. A statement was made to them to the effect that about $100,000 was actually sponged from the citizens annually by light weight in coal. It is high time, certainly, that an effectual remedy was provided for such an evil.

Sugar Plantation Inventions Wanted.

A correspondent writing to us from St. James, Louisiana, says:—"I am sorry that none of our inventors try to invent a convenient reaper for cutting sugar-canes in two places—one close to the ground, and the other cut about five feet above. This is the way we cut them before they are carried to the mill to be run between the rollers, to express the juice. Such an invention would be worth half a million of dollars to the inventor. This part of the sugar-making business is the most tedious, and causes great delay in securing the canes, so that if early frosts come in November or December, they generally injure a large portion of the sugar-cane crop. Any planter in this State would be happy to receive the inventor of such a machine on his estate, for the purpose of allowing him full opportunities for experimenting.

An improved methed of putting up the furnaces of our sugar kettles is also much wanted, so as to economize fuel. If a furnace could be put up to evaporate the juice of a hogshead of sugar with one cord of wood, it would be the means of making a fortune to the inventor, as four or five cords are now consumed in effecting this result, which, I think, is too much. A good furnace that would burn well, and use only bagasse cane as fuel, in sugar-making, would also be a great boon to sugar-planters."

Balancing Saws.

We have received the following letters in answer to the article on this subject on page 169 of the present number of the Scientific American:—

Messrs. Editors—Let your Illinois correspondent, E. S. Wicklin, take off his pitman, and balance his crank-shaft and wheel, so that it will lay still, either side up with the journals resting on horizontal steel bars. Then put the shaft in its place, put on the pitman, and feed with a belt instead of latchet, or rag-wheel and hand; have different grades of belt-wheel to suit the feed to size of log.

Philosophy is a good thing, but facts, learned from experience, sometimes work better in saw-mills than some philosophy.

Oliver Prentiss.

Hoosick, N. Y., February, 1859.

Messrs. Editors—I think there must be some mistake about the balancing weight of forty pounds being placed so far distant as twenty feet from the center of the shaft in Mr. Wicklin's mill. The mill could not operate under such conditions. I will, however, give some directions about balancing saws.

I have always asserted that it was impossible to balance all the forces in a reciprocating motion, but we can come pretty near to it. Let Mr. Wicklin strip the balance-wheel of its weight of forty pounds, and all its connections so as to leave it perfectly free from everything but the wrist and pitman. Let the latter now be disconnected from the cross-head at the top turn of the wheel, so that the centre of the wrist and the center of the shaft, will be on a level, when they must be fastened; now move the pitman, and block up its upper end, in such a position that the center of the wrist, the center of the shaft and center of pitman will be on a level line. The balancing weight may now be placed at the opposite side of the wrist, anywhere between the hub and rim of the wheel, and it should just be of sufficient weight to balance the wrist-boxes and half of the pitman. That is, the wheel is now left to turn as easily as possible, with the balance-weight placed at that distance from the center, where it exactly balances the opposite side. This method supposes the wheel itself to be perfectly balanced in the first place, or very nearly so. This system of balancing the reciprocating parts of a saw-mill, according to my experience, is as near as can be attained. I usually run mills at three hundred revolutions per minute, with perfect safety, when they are so arranged. The following may be taken as a rule. The balance-weight of a saw-mill, to be placed within a wheel, should just be sufficient, in whatever part it may be secured, to balance the lower half of the pitman, the boxes, wrist, gibs, strap, &c.

M. Bliss.

Owego Co., N. Y., Feb., 1859.

[We would state here that the balance-weight of Mr. Wicklin's wheel was placed twenty *inches*, not feet, from the center.—Ed.

Messrs. Editors—I noticed the communication of E. S. Wicklin, in the Scientific American, regarding the balancing of muley saws. I have been engaged in building saw-mills for twelve years, and have succeeded in getting them to run without heating or straining the fastenings of the main bearings or the wrist. In the first place, the foundation should be of the most solid and permanent character. I place my balance-wheel on the end of the saw-shaft, and put the wrist on one of the arms, thirteen inches from the center; the weight of wheel is four hundred and fifty pounds, its diameter 48 inches; the weight of saw, pitman, cross-head, straps, wrist and boxes, amounts to two hundred pounds. The counterbalance is one hundred and twenty-five pounds, placed thirteen inches from the center of the wheel. The speed of saw is three hundred cuts per minute, and have run as high as three hundred and fifty and four hundred cuts. This arrangement of the parts, with the corresponding weights given, enables mills to run smooth and steady, and gives good satisfaction. I have tried various forms, devices, and arrangements, from the simple crank, without any balance-wheel, up to the arrangement described, and have found nothing better. The great object is to get just enough of counterbalance to make the shaft run without beating or *pounding*. There are no doubt some other things to be taken into consideration in the perfect operation of a saw-mill, such as giving the saw its proper *rake*, filing, setting and picthing the teeth, but the foregoing on balancing has been very successful in my practice.

The saw should receive just sufficient rake to clear the timber in its up-stroke, and be ready to cut at the commencement of its down-stroke, The teeth should be long enough, and far enough apart to clear themselves of the cuttings, and they should be filed and pitched to cut the timber clean like a chisel. When cut timber shows unequal marks of the saw-teeth, it is a sign that the mill is not in good order. A saw that is not correctly hung, or is improperly filed or set, will tend to injure the operation of all the rest of the mill. A saw kept in the best order, and one improperly kept, will make a difference in regard to the power consumed of about one-half of the total amount; and as much regarding shocks and heating of the bearings. Let sawyers look well to the condition of their saws if they desire to have their mills operate economically. I have found the steady, continuous feed to be the best for any saw.

A. A. Heathe.

West Greenville, Pa., Feb., 1859.

Lubricator for Axles.

A patent was issued January 18th, 1859, to Reuben R. Brown, of Buffalo, N. Y., for what he denominates in his specification as an excellent, cheap, and durable lubricator for axles and all rubbing surfaces. It is made by taking three quarts of weak ley (from wood-ashes), one quarter of a pound of common bar-soap, and ten grains of saltpeter, and mix them well together in a wooden vessel. Then take one ounce of sulphur, and one quart of oil (common fish oil), and grind the sulphur in the oil; then pour the sulphur and oil into the vessel containing the ley, soap and saltpeter, and thoroughly mix the whole together, and the composition is ready for use. These ingredients should be compounded substantially in the proportions herein specified, whether in large or small quantities, without subjecting them to artificial heat.

ANNUAL REPORT
OF THE
COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE,
January 31, 1859.

SIR—I have the honor to submit the following tables, as illustrating the operations and condition of this office for the year closing the 31st December, 1858:—

Number of applications for patents during the year 1858,	5,364
Number of patents granted (including designs, re-issues, and additional improvements)	3,710
Number of caveats filed,	943
Number of applications for extension of patents	24
Number of patents extended,	20
Number of patents expired Dec. 31, 1858	563

Of the patents granted there were—

To citizens of the United States,	3,668
To subjects of Great Britain,	20
To subjects of the French Empire,	14
To subjects of other foreign governments,	8
Total,	3,710

The patents issued to citizens of the United States were distributed among the several States, Territories, &c., as follows:—

New York,	1,075	Mississippi,	31
Pennsylvania,	447	Kentucky,	30
Massachusetts,	438	Alabama,	24
Ohio,	302	California,	23
Connecticut,	211	North Carolina,	22
Illinois,	155	Georgia,	21
New Jersey,	126	Tennessee,	19
Maryland,	82	South Carolina,	13
Indiana,	82	Texas,	10
Virginia,	61	Delaware,	8
Maine,	58	Florida,	4
Michigan,	54	Washington Territory,	4
Wisconsin,	54	Arkansas,	3
District of Columbia,	52	Minnesota,	2
New Hampshire,	51	Kansas Territory,	1
Rhode Island,	48	U. S. Navy,	2
Missouri,	46	U. S. Army,	1
Vermont,	42		
Louisiana,	54	Total,	3,668
Iowa,	33		

Of the 3,710 patents thus issued, 561 were for inventions relating to agricultural implements and processes, of which 152 were for improvements in reaping and mowing machines; 42 were for improvements in cotton gins and presses and in packing cotton; 164 for improvements in the steam engine; 198 for improvements in railroads, railroad-cars, &c.; and 116 for improvements in the sewing machine. Since the issue of the first patent for the latter to J. J. Greenough, in 1842, two hundred and eighty-five patents have been granted for improvements upon it. This machine, so wonderful alike for the delicacy, and accuracy, as for the simplicity of its operations, may now be regarded as rapidly approaching perfection, and as destined to bless all lands with its truly beneficent ministrations. In form so cheap as to be within the reach of the humblest household, it new enables a single female to perform within the accustomed hours of labor, with slight fatigue an amount of sewing which would be a painful task for twenty-five operatives stitching with the hand and needle. The belief is confidently entertained that, at no distant day, it will become almost universal as were the distaff and spinning-wheel of the olden time; but unlike these memorials of ceaseless toil, it will enter the homes of impoverished and suffering humanity to lighten the burdens and brighten the lives of those whose elevation and happiness have been the unceasing care, as they are now the crowning glory, of the Christian civilization of the world.

The total receipts of the Patent Office for 1858 were $203,716 16, and there were $39,719 46 in the Treasury at the commencement of the year. The expenditures were $193,193 74, leaving a balance on hand in the Treasury of $50,241 88.

TABLE EXHIBITING THE BUSINESS OF THE OFFICE FOR SEVENTEEN YEARS, ENDING DEC. 31, 1858.

Years.	Appl'ns filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1842..	761	291	517	$26,505 68	$31,241 48
1843..	819	315	551	25,315 81	30,776 96
1844..	1,045	380	502	42,509 26	36,344 73
1845..	1,246	452	502	51,076 14	39,395 65
1846..	1,272	443	619	50,954 16	46,158 71
1847..	1,551	533	573	63,111 19	41,878 35
1848..	1,638	607	660	67,576 69	58,905 84
1849..	1,955	595	1,070	80,752 78	77,716 44
1850..	2,193	602	995	86,927 05	80,100 95
1851..	2,253	760	869	95,738 61	86,916 93
1852..	2,639	996	1,020	113,056 34	95,916 91
1853..	2,673	901	958	121,527 45	132,869 83
1854..	3,224	868	1,302	163,789 84	167,148 32
1855..	4,435	906	3,024	216,459 35	179,540 33
1856..	4,960	1,024	2,502	192,585 02	199,951 02
1857..	4,771	1,010	2,910	196,133 01	211,583 09
1858..	5,364	943	3,710	203,716 16	193,193 74

It will be observed that the depression under which the business of the office was laboring at the date of the last annual report has passed away, and that the rebound from the disastrous effects of the revulsion of 1857, then so confidently predicted, has already been fully realized. The applications of 1858 amount to 5,364, against 4,771 in 1857, and 4,960 in 1856, while the receipts show an excess over the expenditures of $10,522 42, against a deficit of $15,450 08 in 1857.

From the most reliable sources of information to which access could be had, the subjoined table has been compiled, with a view of exhibiting the comparative progress of inventions for a single year in the several countries therein enumerated.

Country.	Patents granted in 12 months.	Population
France	5,820	35,781,628
United States	3,710	28,191,918
Great Britain (sealed)	1,890	27,511,447
Belgium	1,406	4,426,302
Austria	708	36,514,466
Sardinia	171	4,368,972
Saxony	107	1,328,732
Sweden	64	3,482,541
Victoria (Australia)	53	410,766
Prussia	49	16,922,721
Bavaria	41	4,519,546
Netherlands	39	3,203,333
Russia	26	69,660,146
Hanover	20	849,958

It is a fact as significant as it is deplorable, that of the 10,359 inventions, shown to have been made abroad during the last twelve months, but forty-two have been patented in the United States. The exorbitant fees exacted from the foreigner, and the severity of the offensive discrimination established to his prejudice, afford a sufficient explanation of the result. Were we to judge alone from the 9th section of the act of 1836, it might well be concluded that the government of this country regarded an invention made beyond the seas as something intrinsically dangerous, if not nexious, the introduction of which it is morally just and politically wise to burden with taxation, just as you would thus burden the importation of some foreign poisonous drug. There is a loftier view of this question, and one deemed more in harmony with the progressive spirit of the age—a view which hails the fruits of the inventive genius, in whatever clime matured, as the common property of the world, and gives them cordial welcome as the common blessings of the race to whose amelioration they are devoted.

Since the month of November, 1857, a board temporarily organized, and consisting of three examiners, specially detailed for this duty, have been occupied in the examination of appeals from the decision of the primary examiners to the Commissioner. During the past year they investigated and disposed of 535 cases, in most of which they have submitted elaborately prepared reports. The results of their action have been eminently satisfactory, and have commanded, it is believed, the entire confidence of the country. The withdrawal of these officers from their respective classes has practically reduced the examining corps to nine instead of twelve, the number at which it was fixed in 1856. The applications of that year amounted to 4,960, those of 1858 amounted to 5,364; so that, with a reduced force, there is a heavy increase of the labor to be performed. This is unfortunate, and to be deplored, in reference alike to the public and the inventor. The former have a deep interest in that thorough and faithful examination of applications contemplated by the patent laws, in order that rights which belong to all may not be unjustly monopolized by one; the latter has the same interest, lest a patent, hastily and incautiously granted, should prove in his hands but a lure to draw him into harassing and impoverishing litigation. The legalization of this board, and the restoration of examiners to the three classes now virtually deprived of them, would furnish at once the relief required.

Since the establishment of this temporary board of appeals, the classes from which its members were respectfully withdrawn, have been in charge of those who have the rank and pay of assistant-examiners only. In the new position, however, assigned them, they have had imposed upon them the responsibilities of examiners-in-chief; and it is due to them to say that they have discharged their duties with zeal and fidelity. In my judgment, it is but just that they should be compensated according to the character of the services they have rendered. Assistant-examiners similarly circumstanced were provided for by Congress in 1856, and I commend the claims of those now referred to, to your favorable consideration.

There are now on file in this office upwards of twenty thousand models belonging to rejected cases. For a series of years they have, for want of sufficient room, been kept in a condition little favorable to their preservation or usefulness. They present a chaotic and partially dilapidated mass of mechanical devices, of no value as compared with the space they will occupy, and the expense their repair, arrangement, and preservation will involve. The fact that they are illustrations of inventions which have been determined to be not patentable, generally for want of novelty, is proof conclusive that they are, in effect, but duplicates of illustrations previously existing, and a large portion of which are already preserved in the office in patented cases. There would seem, therefore, to be no adequate motive for permitting them longer to encumber the building. The west wing of the Patent Office, to which, if retained, they must be transferred, is approaching completion; and the present moment—before the heavy expense incident to their restoration and custody is incurred—is deemed appropriate for deciding the final disposition which shall be made of them.

The defects in existing patent laws have again and again been pointed out in the annual Reports of this office, and are believed to be thoroughly understood and appreciated by the country. The subject has been so often and so earnestly pressed upon the consideration of Congress, that I cannot regard it as my duty, if indeed it would be my privilege, to renew the discussion at this moment. I cannot, however, forbear expressing again with emphasis my conviction as to the necessity of a change in that feature of the existing law which withholds from parties to controversies pending in this office the process of subpœna for compelling the attendance of witnesses, and the production of papers. Every judicial tribunal in the land, from the highest to the lowest, no matter how paltry the amount in contest, is armed with this authority; without which, indeed, the administration of public justice would prove but little better than a mockery. With the issues of fact to be tried here are often bound up the whole fortunes of inventors, and the interests they involve are estimated by thousands and hundreds of thousands of dollars. Under the pressure of legislation, the parties to these issues are driven into this office, and compelled to have them investigated and decided here, while at the same time they are denied the only instrumentality by which their rights can be vindicated and maintained. They are thus forced to beg their testimony as an alms, or buy it as they would their provisions upon the shambles of the market. They are completely at the mercy of those witnesses who sell the truth, and are, of course, often subjected to the most onerous and not unfrequently to the most infamous exactions. It is a great and monstrous injustice, which admits of no defense, of no palliation, and which cannot fail to shock the moral sense of all who, in the heady current of political life, can be induced to pause long enough to contemplate its revolting features. It may well be doubted whether an evil of such deformity, and unredeemed as it is by any pretence of right or reason, would, if exposed as this has been, under any other form of government upon the earth, have been permitted to endure for a single day.

In view of the frequency with which the proposed changes in the patent laws have been urged upon the notice of Congress, it has been with extreme diffidence that I have ventured even a passing allusion to the subject. A just estimate of the magnitude of the issues of which this office has charge, and a conviction of the vastly increased efficiency which these changes would secure to its administration, must be my apology. A class of men who have given to their native land and to the world the cotton gin, the steam engine, the electric telegraph, the reaper, the planing and sewing machines—inventions whose beneficent influences tell with measureless power upon every pulsation of our domestic, social, and commercial life—may well be pardoned for believing that their wants should not be treated with entire indifference by that body, which represents alike the intellect and heart, as it does the material interests of the great country of which they are citizens.

J. HOLT.

Sources of Nitric Acid.

One of the most useful acids employed in the arts is made from salts found in a natural condition in various parts of the world, under the names of nitrate of soda and nitrate of potash, or saltpeter. The mammoth cave, in Kentucky, furnished a considerable portion of such salts for making our gunpowder during the war of 1812, but most of those which are used come from India and South America. From such salts nitric acid (aquafortis) is manufactured, for the purpose of refining all our California gold; and were it as cheap as sulphuric acid, it would be very extensively employed for refining all oils which have a repulsive odor, as it possesses powerful deodorizing properties. Were the salts of niter more abundant and cheap, a very great improvement in several arts would be effected, just as has been accomplished by improvements in the manufacture of sulphuric acid. Two hundred years ago, this acid sold at the rate of one dollar an ounce—now it costs about three cents per pound. So necessary is this acid in the arts, that Liebig actually considers that the quantity of it used in any country is a fair test of its *status* in the useful arts.

Personal.

No. 59 Gower-st., Bedford-square,
LONDON, January 21, 1859.

JOHN A. HAVEN, Esq.:

My dear Sir—I observe that the SCIENTIFIC AMERICAN has noticed an article which recently appeared in the *Engineer*, entitled "American Originality," in an offensive allusion to myself. I am charged with its authorship. Permit me to state that I had no hand in writing the article in question, nor am in any way responsible for its appearance. I am able to state that the real author is a native Englishman, a gentleman more than sixty years of age, and who is not nor ever has been a broken-down editor. The attack upon me by the AMERICAN is *so wanton*, so entirely gratuitous, that I cannot now look to that journal for the justice of an acknowledgement; you, I am sure, will not fail to do me justice before my countrymen, from whom I can sincerely say I have never lacked either pay or appreciation. Very truly yours,

ZERAH COLBURN.

[Mr. Colburn will probably be astonished at our generosity in giving place to his card, which we find in the columns of our respectable cotemporary, the *American Railway Times*, and we beg to assure him that he can, at all times, confidently look to the SCIENTIFIC AMERICAN for justice, whenever he considers himself aggrieved. There is, however, a bit of presumption in Mr. Colburn's card, when he speaks of "an offensive allusion to myself," "I am charged with its authorship," &c. Our readers will learn, for the first time, that we charged him with the authorship of the article upon which our strictures were based; in fact, we did not know when we wrote, whether he was in England or Hindostan. He has, evidently, applied the coat to his own back, imagining that it was intended to fit him. We are happy to know that our absent countryman is still appreciative of us, who remain at home, and to be assured also that the real author of the *casus belli* is a venerable Englishman, and in Mr. Colburn's estimation, a *gentleman*. We could hardly have believed it without this endorsement.]

Patent Lobbying in Congress.

The Chaffee India Rubber patent, which expired about five years ago, and for an extension of which there has been so much lobbying in Congress, during the past three years, appears to have become a repugnant subject to that honorable body. On the 2nd inst., Mr. Edie, of Pennsylvania, moved for a discharge of the House, as chairman of a committee, from a further consideration of the bill for extending this patent for seven years. The House did not, on that occasion, suspend its rules for the consideration of this question, but this motion, made in behalf of the committee, is a straw thrown up to see how the wind blows in that direction. This patent, we are confident, will not be extended by act of Congress; and those who have been lobbying for the purpose of getting it so established, have only sown to the wind.

OUR PRESENT NUMBER.— It may not be uninteresting to many of our readers to know that the engravings alone of the present number of the SCIENTIFIC AMERICAN cost us about $300. We are determined that no other journal of the kind, now published, shall equal it in sound, practical, interesting information in the field to which it belongs. Our endeavor has ever been to convey to our readers a knowledge of practical science in a popular manner, so that it may not only instruct but also gratify them at the same time. Although our circulation is steadily increasing, by the kind exertions of friends, yet we would appeal to them again to aid us in extending it still more. Will our friends heed this call and get their neighbors to subscribe? See clubbing terms in the last column.

IT is anticipated that the railroad from the Mediterranean to the Red Sea will be finished this year, thus adding another link to the chain of the brotherhood of nations.

M'CORMICK'S EXTENSION CASE.

COMMISSIONER HOLT'S DECISION.

[CONCLUDED.]

UNITED STATES PATENT OFFICE, January 28, 1859.

On the application of CYRUS H. MCCORMICK, *for the extension of a patent granted to him on 31st January, 1845, and re-issued on the 3d of August, 1858, for Improvement in Reaping Machines.*

The invention of 1845, considered in itself, and examined in presence of the reaping machine as then in successful operation, both in Europe and America, can scarcely be regarded as brilliant, or in any degree extraordinary. Waving any notice of the curvature of the bearers—which has not been deemed worthy of special comment in any quarter—we have, as a prominent feature, the inside divider taking the form of a crooked metallic rod, and performing the same function as that previously accomplished by the inclined edge of the wedge-shaped wooden divider. The substitution of such a rod for the diverging edge of the divider previously in use, was certainly within the scope of ordinary mechanical skill. The adjustability of this rod was undoubtedly a new and useful improvement; but even with this, in certain conditions of the harvest, it was inoperative. Ansel Chappel deposes that when the grain was damp or a little green, it wound around the rod and clogged the machine; that, in consequence, under applicant's orders, he detached it, and directed others using it to do the same, and that applicant said to him, the machines with this rod would do well enough in dry grain, "but that he thought they would do better in any grain to have the iron off." So much for the position taken that this form of divider is invaluable, if not indispensable, for the successful working of a machine. The outside divergence is fully shown in applicant's patent of 1834, and is a well-known device, while the divergence in a vertical direction is apparent in Dobbs' patent and in Beale's improvement on Ambler's invention as patented in 1835.

There are at least twelve patents of an earlier date than 1845, in which the reel and divider operated in combination, and in which the former aided, with a measure of success at least, in the division of the grain. Among these may be specially enumerated the applicant's patent of 1834, and Schnebly's of 1833. While the combination of the ends of the reel-ribs with the divider, as set forth in the invention of 1845, has been recognized as presenting a patentable novelty, its improvement upon the pre-existing and distinctly developed idea, is not marked or distinctly defined.

The open space in which the ends of the reel-ribs revolve, and which is necessary to prevent entanglement of the grain, though found in the machine as now constructed under the patent of 1845, cannot be credited to applicant. In this patent this space was obstructed by the reel-post, which has been since removed, and the horizontal arm substituted as a supporter. This substitution seems to have been first made by the witness D. T. White, and has since been adopted by the applicant. It is a device borrowed from Bell's machine patented in 1826.

Not to pursue further the examination of the details of this invention, the question arises, what was its value as a whole? The answer on this point is distinct and uncontroverted. The machine as constructed under it was without a seat for the raker, who had to perform his task walking at its side. The applican"s brother, an intelligent practical farmer, in his deposition says, "as a farmer, I used the reaper without a seat, before a good one was invented, and am perfectly certain it was so nearly worthless, that a machine without one could not be sold at any price that would pay, in competition with one having a raker's seat; this is my experience from my intimate connection with the business for many years." There is nothing in the record in any manner assailing this evidence, or tending to show that the machine of 1845 had any success. Indeed it was impossible that it could have. The stoutest man could not endure the toil of following it and raking incessantly as it progressed. However well, therefore, it may have divided and cut the grain, for want of the seat it was valueless. And yet it is precisely this machine, thus practically inoperative and worthless, that on the expiration of the patent, will be surrendered to the public, and no more. It is therefore for such a machine only that the public are bound to make remuneration, and it is such only that can be examined in the estimate we are now considering. It was a conviction of the inefficiency of the machine that led the applicant to make his invention of 1847, which, by a modification of pre-existing elements, provided an advantageous location for the raker's seat. Upon this his fame as an inventor rests, and to this is his reaper indebted for the triumphs it has achieved. This seat had been previously known in at least nine patented reapers; but it had not been well placed, and an appropriate location for it was, up to 1847, an acknowledged desideratum. Whatever, however, may have been the value or the success of the reaper as improved in 1847, such value or success can exert no influence in determining the issue under discussion.

It is constantly urged as a means of exalting our estimate of the invention of 1845, that a reaper is not complete without it, and it would seem to be the aim to deduce therefrom the inference that this invention should be treated as embodying the value of the whole machine. When it is remembered that Hussey's, Bell's, and other reaping machines had long been in successful operation, both in Europe and America, this assumption is a proof rather of boldness than discretion on the part of those who make it. Could it, however, be maintained that this invention is indispensable to a successful reaper, still the conclusion sought to be drawn from it, would by no means follow. The same thing might be said of the cutter set forth in the patent of 1845, and which was and is public property. Take it from the reaper as made under that patent, and applicant's invention would be wholly inefficient, and so of the other well-known parts of the machine. Nothing can be more illogical and fallacious than to maintain that the entire value or usefulness of a machine may be properly assigned to any one of its component parts, merely because the withdrawal of such part would leave the machine imperfect. Such a doctrine virtually asserts that each spoke in the wheel may claim to embody in itself the werth of the whole, because its absence would leave such whole incomplete.

It is alleged, in effect, that however much the invention of 1845 may be lacking in those characteristics which excite admiration and dazzle the imagination, yet that it has conferred immeasurable benefits upon the country, for which a corresponding compensation should be made. In this regard the preparation of the case is signally and fatally defective. Of all the experts acquainted with these machines, or mechanics engaged in their manufacture, or farmers employing them in their fields, none have been called to testify either as to the intrinsic value of this invention, or as to what share it has had in the advantages which the reaper, as an entirety, has bestowed upon the public. Upon this point, so vital to the applicant's case, the record is a perfect blank. If any judgment could be formed on the subject, it would be done gropingly, and in the absence of that light which the law requires that the applicant, who holds the affirmative of the issue, shall furnish. The account assures us, in sweeping terms, that "the public has derived an immense advantage from the fact that the use of these machines has at least doubled the wheat crop in the Western prairie States, whereby a gain to the whole country of not less than $100,000,000 in the term of the patent has been produced." No data whatever are afforded which would enable us to scrutinize the process by which this conclusion has been reached. The one hundred millions are set forth as the profits of 73,200 reaping machines operating in the West, of which those of the applicant constitute but a part. Yet we are furnished with no statistics, either as to the amount of land in cultivation, or the quantity or value of the grain grown, nor, as already stated, as to what part this particular invention played in producing this extraordinary result. The entire region from which this estimate is drawn, as presented to us, is one of absolute and wild conjecture, too dimly lighted to be pressed by the feet of public justice. The testimony justifies the opinion, that the wheat crop of the West has been doubled by the reaping-machines there in use; but it leaves us without any means of judging as to the amount or value of that crop, or what proportion the machines made by the applicant have borne to those introduced by others, and known to be in successful operation throughout the West. This item—vague, extravagant, and unsustained as it is—deserves not a moment's consideration. The account further sets forth, that the 73,200 machines claimed to have been made either by the applicant or those infringing his patent were, after rerimbursing their cost, worth $500 each to the farmers using them, which exhibits an aggregate profit of $36,600,000. Of these machines, but 23,200 were manufactured and sold by the applicant; and it is not easy to perceive on what ground he can insist upon being credited with the benefits bestowed upon the remaining fifty thousand. If it be upon the assumption that they were infringements upon his patent, then the law gives him ample remedy by suit against the infringers; and should he be credited in this proceeding, as demanded, his right of action would still exist, and, if pursued, might result in giving him virtually a double compensation. The testimony, however, is not such as to warrant me in pronouncing them infringements. A large part of them were made under the Manny patents, which the Supreme Court has decided are not infringements of those of the applicant. Dismissing, then, from the account, these 50,000 machines, there remain 23,200, which, at $500 each, will give $11,600,000. It will be observed, that this sum is what the *entire* machines, including the inventions of 1845 and 1847, and all pre-existing elements, yielded to those who used them. After the enumeration which has been given of the component parts of the reaper existing prior to 1845, which were public property, and which were adopted by the applicant, it must be sufficiently manifest that his invention constituted an exceedingly small part of the machine, and that, in consequence, an exceedingly small part of this sum of sum of $11,600,000 should be set down to the credit of his patent of 1845. The attempt on his part to exclude from the estimate those portions of the machine which had been the gradual accumulation of the intellectual toil of the preceding sixty years, is wholly unwarrantable. Without the parts thus slowly accumulated and combined, and which have been so unhesitatingly appropriated by himself, his own invention would have been as valueless as would be a shingle to him who could find no house-top on which to nail it. The construction insisted on would compel the public to pay again, and pay extravagantly, for that which is already its own, alike by purchase and by long uninterrupted possession.

If, however, the supposition can be indulged, that the applicant is entitled to compensation for all the benefits conferred upon the public by these 23,200 machines, is not his claim one which he could compromise or abate at pleasure, and has he not done so? It was competent for him either to sell his invention or dispose of licenses for its use, or use it himself, by manufacturing and selling the machines. The public was necessarily passive, or, at least, could act only in response to his action. It could make him no remuneration, beyond what he himself prescribed or rendered practicable. He did not sell or attempt to sell the invention, and, with a few isolated exceptions, refused to grant licenses upon any terms. To those who approached him on the subject, and desired to purchase, he declined, stating that it would be more profitable for him to manufacture the machines; and this he has continued to do to the present time. Without the pressure of necessity, or of any influence that could improperly sway his judgment or feelings, he set a price upon the machines, which, with the complete knowledge he had of their cost, he was satisfied would yield an ample remuneration. If they proved profitable to the public beyond the remuneration thus embraced in their price, is it not a fair inference that he intended generously to bestow this profit upon those who used them? This inference certainly could not arise if the public had been unwilling to buy licenses, or had not purchased the machines which he manufactured and put upon the market. The proof is clear, that neither of these conditions existed. The public sought to obtain licenses, but could not, and the machines have been bought as rapidly as made; indeed, there have been times when the supply was not equal to the demand. The public, then, has filled to the very brim the measure of compensation which the applicant demanded. It could do no more. If it is insufficient, it is undeniably his own fault, and cannot be urged in support of this application.

The theory that each of the 23,200 machines having yielded to the public a benefit amounting to $500, a corresponding compensation should be made to the applicant, has been rendered impossible by his own action. He deliberately fixed a price upon them, which gave him a profit of about $70 on each, which being deducted from the $500 realized from it by the public, must leave that public, in his debt $430 for each machine sold. The more machines therefore sold, and the longer the patent should exist, the greater would be that indebtedness, and the more glaring the inadequacy of the compensation made. Assuredly this theory, in view of applicant's own course of conduct, is utterly delusive.

In the criticism which has been necessarily made upon the invention of 1845, there has been no design to detract from the acknowledged value and usefulness of the machine, as constructed under the patent of 1847. It has had its brilliant successes in England and France, but it has also had its marked discomfitures when competing with other machines. Though enjoying a great, and perhaps a still expanding popularity, it is by no means a universal favorite. Operating but indifferently upon hilly or broken ground, it is but little used east of the Alleghanies; and for exportation, Hussey's seems to be preferred. Its proudest triumphs have been achieved upon the vast, level prairies of the West, on whose border the applicant resides, and it is there that it is probably destined to find the theatre of its future and permanent usefulness.

No disposition has been felt to disparage the claims of the applicant as an inventor. He has, it is alleged, devoted twenty-seven years of his life to perfecting his inventions and introducing them into public use. For his patience, zeal, and indomitable energy, in the midst of almost life-long difficulties, and for the genius with which he has surmounted them, he has deserved, and is receiving, the warm commendation of the world. As a public benefactor, the measure of his fame is already great, and is perhaps still enlarging, while the colossal fortune in his hands is proof conclusive of the lavish liberality with which his labors have been requited. He has been so fortunate as to link his name indissolubly with a machine which, unless outstripped in the race of progress, may endure as a proud memorial, so long as the ripening grain shall wave over the boundless plains of the West, or the songs of the reaper shall be heard in its harvest-fields. Yet, were it permitted to embrace in this estimate the value of the reaping-machine as an entirety, I might hesitate to pronounce his reward sufficient, great as it has been. But remembering, as it must be done, that in 1845 it was already in practical, successful operation, and its essential elements public property or the property of other patentees, and that its crowning excellence as constructed by the applicant—the raker's seat of 1847—still belongs to him, and can be enjoyed by the country only upon such terms as he may dictate; and confining, therefore, as I am compelled to do, my estimate to the isolated features patented in 1845, I am constrained to say that, for this improvement, the public has made to the applicant not only a reasonable, but a most abounding remuneration.

The application must therefore be rejected.

J. HOLT,

Notes and Queries

* * PERSONS who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

NUMBERS 4, 14, 17, and 19, this volume of the SCIENTIFIC AMERICAN, cannot be supplied, as we are entirely out of them.

J. M. L., of S. C., inquires if we can tell him "in round terms the number of cubic feet of steam (under one atmosphere's pressure) required to keep a high-pressure engine of, say, one-horse power, in operation for five or ten hours; in other words, what measure of water is required for steam by said power in said time." We can answer our correspondent's question as follows:—One cubic foot of water per hour evaporated into steam is held to be a horse-power, and water evaporates into 1,601⅓ its former bulk as steam. Five cubic feet of water will last five hours.

N. N. E., of Ga.—There is no good work extant devoted to the interests of cotton manufacturing.

C. E., of Conn.—You seem to imagine that we are not willing you should fly across the Atlantic Ocean. We beg to assure you that we have not the slightest objection to your flying to the moon if you can; and after you have fairly landed on that orb, we advise you to push on towards some of the fixed stars. You sought our opinion respecting your scheme, and we honestly pronounced it impracticable and visionary; if you think differently, try it.

D. E. S., of N. Y.—We cannot supply the missing numbers of the SCIENTIFIC AMERICAN you want. This is the only reason why they were not sent before.

R. T., of Ind.—The power necessary to run two four-foot burrs will be about 8-horse power; and as you have an effective head of water of 18 feet, and as the actual effect of a re-action wheel is about 75 per cent, you will need 313 cubic feet of water per minute in order to obtain the required power.

A. W., of Maine.—We do not believe it possible to build a ship in two parts, joined together, that would be able to make a voyage across the Atlantic.

I., of Conn.—You may depend upon it, that an iron wire covered with glass as an insulator, never could be laid safely as a telegraph cable in the Atlantic Ocean.

S. Y., of R. I.—The resistance which is offered to the progress of a body in a resisting fluid is generally assumed to be in proportion to the square of the velocity, so that it will take four times as much power to propel the same float through water with double the velocity. The exact power necessary to propel a float of one square foot area with a velocity of one foot per second through sea water cannot be determined by calculation, and the most eminent mathematicians have not been able to find formulas which would be applicable to such cases. The safest way to ascertain this will be by actual experiment.

7

C. J. E., of S. C.—Gutta percha pipe can be made to stand a water pressure of between two and three hundred perpendicular feet of water. It must be of such a thickness as will correspond to the pressure. Address S. C. Bishop, 181 Broadway, this city, about its price, and state what you want it for.

W. M., of Ill.—In the article you refer to regarding the explosion at St. Louis, it is not stated that the plates of the boiler were heated to 1,172° Fah. You should read it again more carefully. There must be some mistake on your part as to the steam being elevated to 1,172° in a boiler containing water.

N. J. F., of R. I.—A screw has been employed for a rotary engine by confining it in a tight case. It is an old hydraulic device.

O. S., of Iowa.—Glazier's diamonds can be procured of John Dickinson, 64 Nassau st., this city.

J. E. R., of Texas.—The best way for you to obtain the Patent Office Reports is to write to your Member of Congress. He is furnished with a large number of copies for distribution among his constituents.

J. M., of Ind.—You can render skins soft and pliable for gloves by running them through strong soapsuds, then immersing them in a solution of alum for ten hours, from which they are taken and dried. You should visit a morrocco leather manufactory to obtain full information regarding the implements employed in the art.

T. W., of Pa.—You state that your hall is 45 feet wide, 69 feet long, 17 feet high in the walls, but arches to the crown 25 feet, being a rise of eight feet. The arched roof is the sole reason why it is so defective for public speaking. Place the platform at one of the corners, and try what effect this will have. If it is not successful, you must put up a sounding-board above the platform, or lower the arched roof.

P. G. B., of N. Y.—Silicate of soda is a compound of silicic acid and soda, and in the back numbers of the SCIENTIFIC AMERICAN you will find much information about it. The best materials of which to make a filter are charcoal and fine sand, laid on a flannel bed.

KEROSENE, CAMPHENE, AND PHOSGENE.—We not unfrequently are interrogated regarding the composition of the above-named substances. The first, "kerosene," is coal oil, manufactured by distilling cannel coal in retorts, at a comparatively low temperature, and condensing the product. The first oil which passes over is not suited for burning; it requires to be purified from bitumen by the action of acids, and one or two subsequent distillations. The second, "camphene," is simply refined turpentine, the product of several distillations. Many persons suppose that it is an explosive fluid, and not safe to burn in lamps; they mistake it for what is known as "burning fluid," which is "phosgene." This is a composition of camphene and alcohol—one part of the former to four of the latter; it is the well-known explosive fluid.

G. S. S., of Pa.—We have the testimony of several parties to the effect that water wheels do more work during night than in the daytime; but we are not in possession of any authentic experiments in support of such statements.

H. W., of Ohio.—Hard silver solder is made by melting one part of brass in two parts of pure molten silver. The diagram of a "cut-off" which you have sent us is not very distinct; it appears to be a common "four-way-cock valve."

J. J., of Pa.—We are not acquainted with any published work on the adulteration or imitation of French brandies. We know, however, that good imitations of French brandy are made from malt liquors by adding crude tartar, a decoction of French prunes, and a little extract of catechu. Lard oil may be colored light green with a very minute quantity of verdigris; it then resembles olive oil.

E. J. R., of La.—You will find an illustration of Ericsson's small hot-air engine on page 268, Vol. XIII, SCI. AM. We have heard of the celebrated sugar calometer invented by a native of Porto Rico, but have never seen it, and presume we never will. We look on the wonders which it is designed to accomplish as a series of Carribean fables.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, February 19, 1859:—

J. W. A., of Wis., $30; S. S., of Pa., $55; R. S., of N. Y., $30; T. & T., of N. Y., $30; M. K., of Pa., $250; M. & C., of N. Y., $10; D. & W., of Pa., $30; W. C., of Pa., $10; C. W. W., of N. Y., $30; J. B. C., of Ind., $25; J. R., of Pa., $30; P. L., of Maine, $25; B. A. G., of Ill., $30; W. H. A., of Iowa, $30; S. R. H., of N. Y., $30; B. P., of Ind., $10; J. F. S., of Mass., $30; O. H. H., of Ill., $30; T. B., of N. Y., $30; F. W., of Ohio, $43; L. R., of Mass., $30; W. D. S., of Maine, $30; N. E. H., of N. H., $25; E. O. B., of Ill., $25; T. N., of Mass., $30; H. M., of N. Y., $30; P. A., of N. J., $30; H. & S., of N. Y., $25; H. T. S., of R. I., $30; M. S. B., of Conn., $55; H. M., of Ky., $30; B. M. L., of Ala., $15; H. L., of N. Y., $30; W. M. S., of Ky., $30; O. M. P., of Ill., $30; E. B., of Mass., $25; E. B., of N. Y., $30; H. W. F., of N. J., $25; P. C. L., of L. I., $25; A. W., of N. Y., $25; C. & B., of N. Y., $25; W. H. G., of N. Y., $25; J. McK., of N. Y., $32; McC. & D., of L. I., $25; L. B., of Cal., $30, D. H., of N. Y., $115; A. P., of Vt., $50.

Specifications and drawings belonging to paries with the following initials have been forwarded to the Patent Office during the week ending Saturday, February 19, 1859:—

J. S., of N. J.; J. B. C., of Ind.; C. W. W., of N. Y.; H. W. F., of N. J.; S. D., of Mich.; P. C. L., of L. I.; J. R. & H. M. B., of N. Y.; E. O. B., of Ill.; L. K. S., of Conn.; N. E. H., of N. H.; F. W., of Ohio; S. W. of Ohio; S. W., of Vt.; J. W., of N. Y. (two cases); A. W., of N. Y.; C. & B., of N. Y.; W. H. G., of N. Y.; H. & S., of N. Y.; S. & C., of R. I.; J. C. E., of Ark; E. B., of Mass.; W. M. S., of N. Y.; H. F. B., of Ind; McC. & D., of L. I.; L. B, of Cal.; D. H., of N. Y. (two cases); A. P., of Vt.

JOSEPH H. BRINTON'S PATENT ELASTIC Self-adjusting Feed Rollers—Patented February 15, 1859—The only perfect feed motion ever invented; for cheapness, durability and simplicity superior to all others. This invention will be found an invaluable addition to planers, feed-cutters, and all other machines requiring a perfectly firm, yet adjustable feed. It will feed any thickness, from one-eighth of an inch to a foot, adjusting itself to all inequalities of surface, and can readily be regulated to any desired rapidity of motion. At a moderate expense it can be applied to any of the above-mentioned machines, whether already completed or in process of construction. Dispensing as it does with all cog gearing whatever, it works with less friction, and to greater mechanical advantage, than any existing contrivance for the purpose. For further information apply to the patentee, West Chester, Chester co., Pa. 1*

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A RARE OPPORTUNITY FOR MEN OF Enterprize—The county and State rights for that popular and highly useful invention, Johnson's Patent Sash Balance," can be had (upon early application) at the following very reduced rates:—For all counties, &c., containing (according to the census of 1850) less than 5,000 inhabitants, $5. For all containing over 5,000 and less than 10,000, $10. For all containing over 10,000 and less than 15,000, $15, &c. Send for a circular. Address ROSS JOHNSON, Frederick City, Md. 25 2*

A MONTHLY FAMILY NEWSPAPER One Year Without Cost.—To any person who will send us the names of fifty intelligent reading men, resident in their Post-office district, we will mail free, for one year, a copy of the best monthly newspaper published in this city. Books, engravings, or any other mailable matter procurable in this city, sent post-paid on receipt of published price. MILLER & CO.,
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CROSSETT'S PATENT STAVE CUTTER—Patented July 1, 1844; re-issued March 2, 1858; renewed and extended June 26, 1858. The above-mentioned machine is warranted to cut more and better staves than any other machine in the United States, and is the most simple, cheap, and durable. I hereby caution all persons against using and vending said machine (the main features of which consist in the stationary knife and vibratory bed-piece) without the legal right to do so. Offenders will be dealt with according to law. All persons wishing an interest in the extended term of said patent can obtain it by addressing the undersigned at Joliet, Ill.
21 7* GEO. I. CROSSETT, Assignee.

CLAY RETORTS—THOS. HOADLEY, PATentee of the Patent Pyro-clay Gas Retorts—manufactory Nos. 32 and 34 Front st., Cleveland, O. 14 12*

BLANCHARD'S SPOKE AND HANDLE LATHE—This justly celebrated lathe for turning spokes, gun stocks, axe handles, and other irregular forms, is manufactured by the HUNTINGTON MACHINE CO., Newark, N. J. 24 2*

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WATER WHEELS—BALDWIN'S "UNIVERSAL TURBINE" gives better satisfaction than any other water wheel, the overshot not excepted. It gives a higher percentage, with a partially raised gate, than any other. It gives from 75 to 97 per cent, according to the size of wheel and head applied. When you purchase a water wheel, my friends, get the best, if you would save money, as the best is always cheapest in the end, and you will have to make no changes. For further information address, S. K. BALDWIN,
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COTTON-OPENERS AND CLEANERS—Kitson's latest improved Cotton-openers, which were introduced September, 1857, have been adopted by the following companies, of Lowell, Mass.: Suffolk, Lawrence, Tremont, Appleton, and Prescott Corporations; and the Pacific Co., Lawrence, Mass.; Cocheco Co., Dover, N. H.; Salmon Falls Co., Salmon Falls, N. H.; Ogden Mills, Cohoes, N. Y., and other places. For price and other particulars enquire of RICHARD KITSON, Lowell, Mass. 21 5*

SECOND-HAND MACHINERY AT VERY low prices for cash.—Steam Engines, Slide Lathes, Planing Machines, Drills, Slotting Machines, &c.; also a variety of Mortising, Tenoning, and Sash Machines, &c., all warranted in good running order. Address CHARLES G. WILLCOX, 135 North Third st., Philadelphia, Pa. 23 4*

A RARE CHANCE—VERY IMPORTANT TO CARRIAGE-MAKERS—For sale, a large and comfortable dwelling-house, with a two-story carriage shop; all the tools and conveniences for carrying on an already profitable business of carriage and wagon making and repairing; also, two acres of fine land, well set with choice fruit trees, in Westchester county, within thirty-six miles of New York, and within fifteen rods of a railroad station. The place can be bought at a great bargain; but if not sold within two weeks, will be let to a secure tenant, as the subscriber is about to remove. Address or call upon HENRY L. LYON, Chappaqua, Westchester co., N. Y., or HORACE GREELEY, Tribune office, New York. 22 2*

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CALIFORNIA AGENCY FOR PATENTS—WETHERED & TIFFANY, San Francisco, will attend to the sale of patent rights for the Pacific coast. References:—Messrs. Tiffany & Co., New York; Wethered, Brothers, Baltimore; George W. Ponds & Co., Boston. 23 13*

SCREW BOLTS—WITH SQUARE, ROUND, or Countersunk Heads, Bolt-ends, Turn Buckles, Square-head Wood Screws, Tap Bolts, Machine Screws, Ratchet and Breast Drills, Carriage Bolts, Nuts, Washers, &c., for sale by CHARLES MERRILL & SONS, No. 556 Grand st., New York. 24 5*

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TO PUMP-MAKERS—THE UNDERSIGNED, having purchased of Hosea Lindsey his entire interest in a horizontal Force Pump invented and patented by him, is desirous of selling State or county rights on reasonable terms, to persons desiring to engage in the sale of a useful and saleable article. Apply by letter or otherwise to WM. W. McDOWELL, Asheville, N C. 24 2*

PORTABLE STEAM ENGINES.—S. C. HILLS, 12 Platt street, New York, offers for sale these Engines, with Boilers, Pumps, Heaters, etc., all complete, suitable for printers, carpenters, farmers, planters, &c. A 2½ horse can be seen in store; it occupies a space 5 by 3 feet; weight, 1,500 lbs.; price, $260. Other sizes in proportion. 2 e3w

GAGE COCKS, OIL CUPS, GAS COCKS, Steam Gages, Globe, Angle and Governor Valves, Flange Cocks, Pumps, &c., manufactured and for sale by HAYDEN, SANDERS & CO., No. 306 Pearl st., New York. 16 13eow*

CORLISS' PATENT STEAM ENGINES—On application, pamphlets will be sent by mail containing statements from responsible manufacturing companies where these engines have been furnished, for the saving of fuel, in periods varying from 2¼ to 5 years. (The "James' Steam Mills," Newburyport, Mass., paid $19,734 22, as the amount saved in fuel during five years. The cash price for the new engine and boilers was but $10,500.) These engines give a perfectly uniform motion under all possible variations of resistance. Two hundred and fifty, varying from about 20 to 500-horse power, are now in operation. Boilers, shafting, and gearing.
CORLISS STEAM ENGINE CO.,
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HOWE'S WEIGHING SCALES—STRONG & ROSS' PATENT. Having received first-class premiums from the Vermont State Fair, New York State Fair, Virginia State Central Fair, United States Fair, Virginia State Fair, and Franklin Institute Fair, within sixty days, we have now only to invite the public to examine our large stock of scales of every variety, and also to test the principle of a six-ton scale, set up on the floor of our store, as well as to examine certificates of their superiority from many of our leading houses. FRANK E. HOWE,
No. 438 Broome st., first door from Broadway, New York.
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BOILER FLUES FROM 1 TO 7 INCH TO SEVEN inches outside diameter, cut to any length desired, promptly furnished by JAMES O. MORSE & CO., 76 John st., New York. 18 13

OIL! OIL! OIL!—FOR RAILROADS, STEAMERS, and for machinery and burning. Pease's Improved Machinery and Burning Oil will save fifty per cent., and will not gum. This oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough and practical test. Our most skillful engineers and machinists pronounce it superior and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The Scientific American, after several tests, pronounced it "superior to any other they have ever used for machinery." For sale only by the inventor and manufacturer, F. S. PEASE, 61 Main st., Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Europe. 14 13

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MACHINE BELTING, STEAM PACKING, ENGINE HOSE.—The superiority of these articles, manufactured of vulcanized rubber, is established. Every belt will be warranted superior to leather, at one-third less price. The Steam Packing is made in every variety, and warranted to stand 300 degs. of heat. The hose never needs oiling, and is warranted to stand any required pressure; together with all varieties of rubber adapted to mechanical purposes. Directions, prices, &c., can be obtained by mail or otherwise, at our warehouse. NEW YORK BELTING AND PACKING COMPANY. JOHN H. CHEEVER, Treasurer, Nos. 37 and 38 Park Row, New York. 14 13

HOYT BROTHERS, MANUFACTURERS OF patent-stretched, patent-riveted, patent-jointed, Oak-Leather Belting; Store, 79 and 80 Spruce street. Manufactory, 210, 212, 214 and 216 Eldridge st., New York. A "Treatise on Machinery Belting" is furnished on application, by mail or otherwise—gratis. 16 12*

PAGE'S PERPETUAL LIME KILN—PATented 1854, 1857, and 1859—will burn 100 barrels of lime every 24 hours, with three cords of wood, or 1¼ tuns of coal, not mixed with lime rock. Will burn every variety of lime rock, marl, or shells. Rights for sale. C. D. PAGE,
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Also for sale by J. C. CARY, 240 Broadway, New York City. 13 tf

PATENT COMPOSITION BELTS—PATENT PACKING—The Company have on hand and are ready to supply all orders for their superior Composition Machine Belting. They are proof against cold, heat, oil, water, gases, or friction, and are superior to leather in durability, and much cheaper in cost. The composition gives to these belts uniform durability and great strength, causing them to hug the pulley so perfectly that they do more work than any other belts of the same inches. The severest tests and constant use in all sorts of places during the last 14 months has proved their superiority, and enables the Company to fully guarantee every belt purchased from them. Manufacturers and mechanics are invited to call, examine, and test these belts. The Patent Packing for planed joints is in every way superior to any other article ever used for that purpose. A liberal discount allowed to the trade. "New York and Northampton Belting and Hose Co.," E. A. STERN, Treasurer, 217 Fulton st., New York. 16 tf

FELT FOR STEAM BOILERS, PIPES, Ship-sheathing, and all varieties of felting manufactured to order by JOHN H. BACON, Winchester, Mass. 14 13*

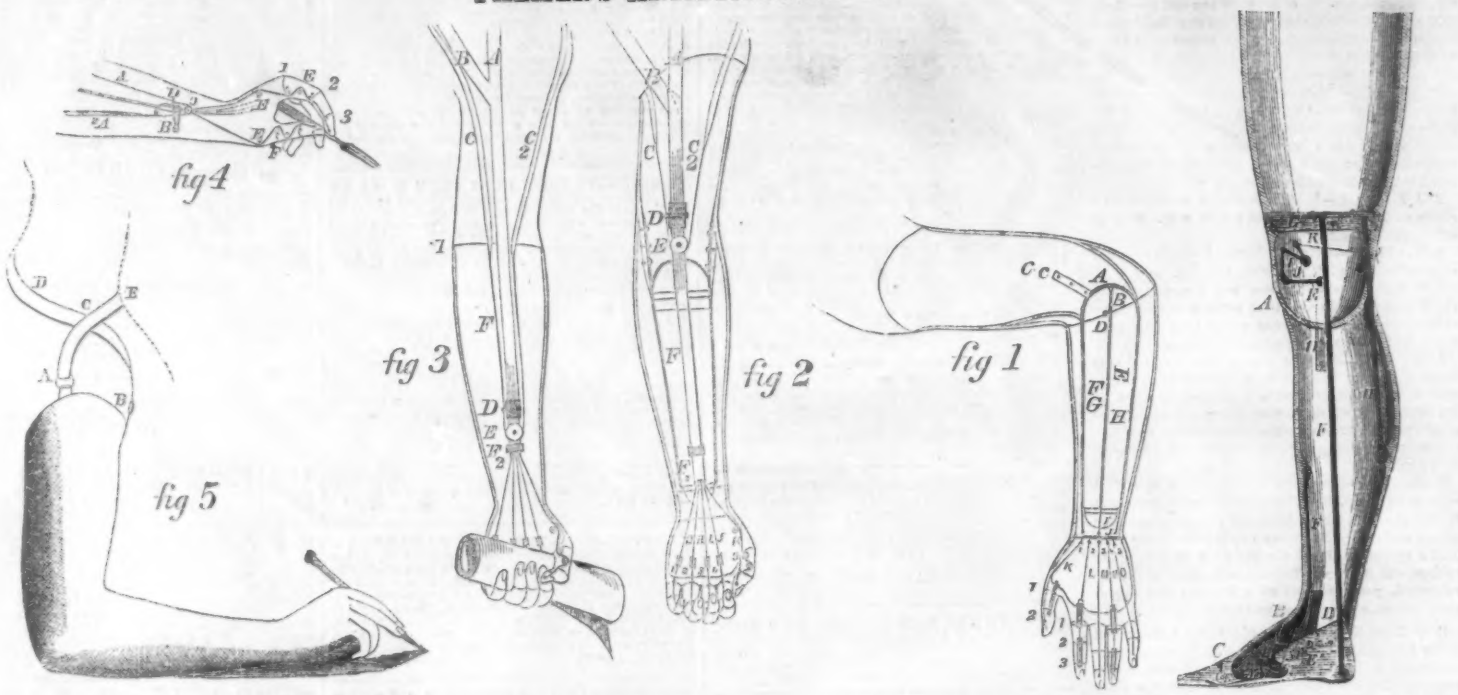
IRON PLANERS AND ENGINE LATHES of all sizes, also Hand Lathes, Drills, Bolt Cutters, Gear Cutters, Chucks, &c., on hand and finishing. These tools are of superior quality, and are for sale low for cash or approved paper. For cuts giving full description and prices, address "New Haven Manufacturing Co., New Haven, Conn." 14 13

WOODWORTH PLANERS—IRON FRAMES to plane 18 to 24 inches wide—at $90 to $110. For sale by S. C. HILLS, 12 Platt street New York. 1 26

A MESSIEURS LES INVENTEURS—Avis Important.—Les inventeurs non familiers avec la langue Anglaise, et qui preferreraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront recues en confidence.
MUNN & CO. Scientific American Office, 37 Park Row, New York.

Zur Beachtung für Erfinder.
Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen belieben man zu addressiren an
Munn & Co.,
37 Park Row, New-York.
Auf der Office wird deutsch gesprochen.

PALMER'S ARTIFICIAL LIMBS.



One of the great misfortunes of humanity is the loss of a limb; whether it be an arm or leg, the calamity is equally distressing, or we should say, *was*; for since B. Frank Palmer, of Philadelphia, has turned his attention to the subject, much of the distress is alleviated, and the personal appearance not at all injured. His artificial legs were, a few years ago, the especial admiration of all the eminent surgeons of the world; and as time has passed away, and they have become more generally known and more extensively used, they have become more highly valued and appreciated. Many persons who have had both legs amputated, now walk with comfort on these artificial ones, instead of being at the mercy of their fellow-men for fresh air and exercise; and there are many who can attend to business, and thus make their livelihood, who, but for these legs, would have been helpless cripples—a trouble to their friends, and a burden to themselves all their lives. We give a perspective view of the exterior of the leg, an internal view, straight, and an internal view, semi-flexed.

The articulations of knee, ankle, and toes, consist of detached ball-and-socket joints, A B C. The knee and ankle are articulated by means of the steel bolts, E E, combining with plates of steel firmly riveted to the sides of the leg, D D. To these side plates are immovably fastened the steel bolts, E E. The bolts take bearings in solid wood (properly bushed) across the entire diameter of the knee and ankle, being much more reliable and durable than those of the usual construction. All the joints are so constructed that no two pieces of metal move against each other in the entire limb. The contact of all broad surfaces is avoided where motion is required, and thus friction is reduced to the lowest degree possible. These joints often perform many months without need of oil, or other attention—a desideratum fully appreciated by the wearer.

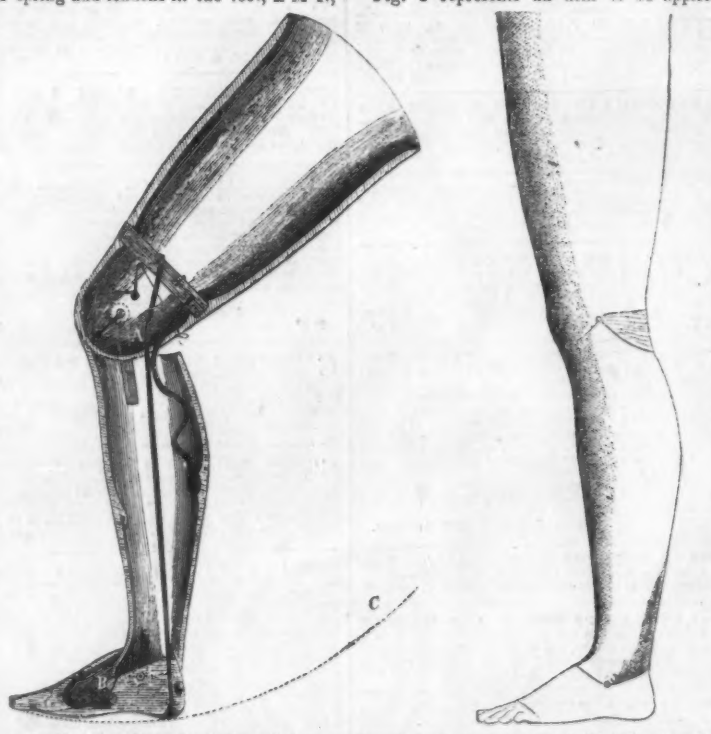
The Tendo Achillis, or heel tendon, F, perfectly imitates the natural one. It is attached to the bridge, G, in the thigh, and passing down on the back side of the knee bolt, E, is firmly fastened to the heel. It acts through the knee bolt on a center, when the weight is on the leg, imparting security and firmness to the knee and ankle joints, thus obviating all necessity for knee-catches. When the knee bends in taking a step, this tendon vibrates from the knee bolt to the back side of the thigh, A (semi-flexed view). It descends through the leg, so as to allow the foot to rise above all obstructions in flexion, and carries the foot down again, in extension of the leg for the next step, so as to take a firm support on the ball of the foot. Nature-like elasticity is thus attained, and all thumping sounds are avoided. Another tendon, H, of great strength and slight elasticity, arrests the motion of the knee gently, in walking, thus preventing all disagreeable sound and jarring sensation, and giving requisite elasticity to the knee.

A spring, lever, and tendon, I J K, combining with the knee bolt, give instant extension to the leg when it has been semi-flexed to take a step, and admit of perfect flexion in sitting.

A spring and tendons in the foot, L M N, impart proper and reliable action to the ankle joint and toes. The sole of the foot is made soft, to insure lightness and elasticity of step. The stump receives no weight on the end, and is well covered and protected, to avoid friction and excoriation.

But the most ingenious piece of mechanism, and one that seems to us as likely to do greater service for humanity in relieving them from the deprivation of enjoyment and capability to work which generally follows an accident, is the arm and hand, of which we present full drawings.

Fig. 1 represents an arm to be applied



above the elbow. The articulation, A B, is a ball and socket, connected by the steel plates, C C, and turning upon the pinion, D. The functions of the bones in the fore-arm (radius and ulna) are imitated by the conical shaft, E, which terminates in a ball at the elbow and wrist, J J. The wrist is articulated with a ball and socket firmly united by catgut tendons, F G H, tensely drawn over the convexity of the shaft, E, at the elbow. It has every motion of the natural wrist. The hand rotates on the fore-arm, being susceptible of pronation and supination, or any angle or degree of flexion and extension desirable. The extensor tendons, K L M N O, acting with the springs, 1 2 3 4 5, open the hand. The detached ball and socket joints of the thumb and fingers are indicated by the figures 1 2 and 1 2 3.

The fingers are articulated on steel rods and pinions imitating the bones, as seen in the thumb and the first and third fingers. The exterior is brought to a perfect imitation of the natural arm (as shown in the outline, or in Fig. 5,) by a soft elastic substance, which rotates around the fore-arm, preserving anatomical symmetry in every position. It is covered with a delicate skin.

Fig. 2 is the same arm extended, with the fingers semi-flexed. The belt, A, attaches the arm to the body. The small belt, C C 2, is connected by a tendon to a clasp and pulley, D E. The great muscle, F, is the continuity of the flexor tendons, G H I J K. These tendons pass sinuously over pulleys or fixed sheaves, 1 2 3 4 5, through the hand, to the end of the fingers and thumb. The principles of the lever and pulley are thus combined, and the maximum power retained at all angles of flexion or extension. A slight motion of the shoulders, with extension of the fore-arm, produces an incredible grasp, as seen in Fig. 3.

An object of any shape, such as a pen, a fork, or an apple, is held with facility. By a slight motion of the shoulders, the belt, A B, causes the great muscle, F, and its tendons, to contract powerfully, closing the hand. A movement easily and naturally made actuates the tendon, C C, and fastens the clasp, D, upon the muscle, so as to retain the grasp in any position or motion of the arm, when in use. This is regarded as invaluable for holding reins in driving, or carrying articles with safety. An easy counter motion unfastens the clasp, relaxing the flexor muscle and its tendons, and the extensors open the hand. This principle performs most perfectly in an arm applied below the elbow, as in Fig. 3. In this are seen the belt, A B C, the great muscle, F, and its tendons, the clasp and pulley, D E, as in Fig. 2. A fixed eyelet, F 2, clasps the great muscle, F, and thus guides the flexor tendons of the fingers. The line, 1, shows the union of the natural with the artificial arm.

Fig. 4 shows a hand holding a fork. The tendon, A A 2, passes through the clasp, B, and around the pulley, C, to the side of the clasp, D, where it fastens or unfastens the clasp by movements before explained. The joints of the fingers and thumb are flexed upon the fork by powerful tension of the great muscle and its tendons. The sinuosity of the tendons passing over the pulleys or sheaves, E E E, shows the new and useful principle of effectually combining the lever and pulley to gain the utmost power, strength, elasticity, and adaptability to the various uses of an artificial arm and hand. They are easily adjusted by the wearer.

Mr. Palmer's inventions are all patented; and he will be happy to communicate with, and give information to any persons interested in the subject of artificial limbs, upon being addressed at 1320 Chestnut st., Philadelphia, Pa.

REMOVAL.

The Scientific American *Office has removed from its old location,* 128 *Fulton st. (Sun Building), to No.* 37 *Park Row (Park Building), where all letters, packages, and models should hereafter be addressed. Entrance is haa to the Office also at No.* 145 *Nassau st.*